

THE AUTOMOBILE

CHICAGO AUTOMOBILE SHOW 1910

Coliseum
Auspices of
N.A.A.M.



G.A.E.

Selecting
the
Auto.



CHICAGO will witness the opening of the Ninth Annual Show of the N. A. A. M. at the Coliseum on the 5th proximo, and from indications, with a precision as to time, which would serve as a standard for the "Twentieth Century Limited" to go by. There will be 78 makes of automobiles, and in some cases several models of the respective makes on view, they coming from the Licensed Association for the most part, the A. M. C. M. A. to a considerable extent, and a few outsiders, to swell the list. Pleasure vehicles of the gasoline

type will represent the bulk of the exhibitors, but electric vehicles will also be in greater presence, and as to commercials, there will be enough of them to adequately indicate that this phase of the automobile industry is now coming into its own.

Those who may not have paid attention to the growth of the automobile industry, would scarcely be able to realize just what this show represents. From the baker's dozen of exhibitors who braved the public at the first show, to the stupendous array of this, the ninth annual exhibition, represents, when the truth is told, the differ-

THE N A T A M SHOW

ence between less than \$100,000 as the value of the first year's product, and \$500,000,000 which is a fair estimate for the present year, counting the money which changes hands in the conduct of the automobile business which would not change hands otherwise.

Between 1908 and 1909, according to the A. L. A. M. records, the automobiles produced by association members increased 130 per cent., but 1910 over 1909 will show an increase, in all probability, of 200 per cent., which figures show absolutely nothing of the increase in quality of the cars produced from year to year. This question of quality is sufficiently broad in its aspect as to include in its makeup a decided advance in the methods of fabricating steel, a wide variation in the details of the production of castings, and as to machine tools, they to-day, as the direct result of the demand of automobile makers, are so much more capable that it is quite impossible to make an estimate which will be believable if it portrays the facts.

Measuring this exhibition in terms of the prosperity which it has engendered, it would be enough to point out the influence it has brought to bear on the machine tool industry alone. It has been conservatively estimated that the value of the new machine tools which were brought into Detroit alone, to satisfy the automobile requirement, was not far from \$85,000,000. It is a well-established fact that the price of a machine tool is probably a good half of the cost of placing the same in operation, considering the jigs, fixtures, and appurtenances which are essential to its proper use. Taking this as a basis, the machine tool builders of this country were benefited directly to the extent of \$170,000,000 by contact with the automobile builders in the city of Detroit.

While it is true that something like 50 per cent. of all the automobiles made come from Michigan, within the measure of a comfortable trolley ride from the heart of Detroit, this is not to say that the value of the automobiles turned out in Detroit and vicinity represents half of the total valuation. A fairly conservative estimate of Michigan's *pro rata* of the total automobile business, as measured in dollars, lies somewhere between 35 and 40 per cent., and considering some percentage within these limits, it will then be possible to estimate as to just what the National Show at Chicago represents in the automobile business as a whole, taking it as it is found to-day in America.

OTHER AND IMPORTANT DISTINCTIONS TO BE MADE

This year the automobiles which are being produced are more nearly in accord with theoretical standards by far than they were even last year, the difference is sufficiently marked as to be self-evident to even a casual observer, and the improvements wrought are in all fairness the reward which comes from closely studying the little details all along the line, whereas in some of the earlier efforts, going back perhaps a year or two, much of the then alleged refinements decamped with the glisten of the varnish, which probably did serve as a coat over the last effort of the rubbers in the process of finishing the car in the factory paint shop.

Exterior finish, in former times, covered a multitude of sins, and convinced buyers in many cases. When purchasers were obdurate their fancy was excited by the dexterity with which the family crest was transferred to a convenient panel, nor did they ponder long over the quality of the machinery equipment, believing, perhaps, if they furnished the chauffeur a leather coat he would find it agreeable to lie on his back beneath the car and gaze longingly at the stars above.

It is a little strange, perhaps, that the quality of the automobiles from the mechanical point of view, improved in the same ratio that overdone exterior finish disappeared. The underlying reason for the changes wrought, lies in the increased quality of the mechanical equipment, and the entire absence of any attempt to disguise lack of quality by an attractive coat of paint. As a matter of experience, it is now fairly proven that the patrons of the industry are a discriminating set and they appreciate quality in the equipment as a whole, and the further fact that some of the earlier creations lacked in comfort-producing details about in the same proportion as the machinery equipment at that time verged away from stability.

OLDER PROBLEMS BOWED TO INTELLIGENT TREATMENT

The National Show, for the very reason that it will have in its makeup all the excellent examples from the several camps and clans, will prove of exceeding value to those who take an interest in the growth and prosperity of the industry, because it will bring together the several schools of design, and accentuate for purposes of inspection, the advantages therein contained, but if some of the schools are lacking in essential particulars, the facts will at once be rendered apparent.

In addition to the automobiles, there will be the accessory divisions numbering in their classifications parts makers, who, to a very large extent, are as the foundation for many of the superior examples of cars. These parts makers serve as specialists in their line; they do some one thing, and that they should become experts, is but natural. Some of the parts makers work to drawings and specifications at the command of the companies who employ them, in which cases, they assume no responsibility beyond that of completing the tasks in conformity with the drawings and specifications. Others of the parts makers, preferring to grow a reputation of their own, offer designs in distinctive form, and being experts from force of habit, are able to convince the makers that they can deliver a better product for less cost.

An innovation will be introduced in the opening ceremonies of this show. It has long been the custom to drag into this performance some political luminary, who knew little and cared less about the automobile business. At Chicago, the idea will be tried of opening the show without any formal ceremony whatever. General Manager Miles will quietly give a signal at the hour of 2:30 Saturday afternoon, at which signal, the show completed on time, will be opened to the public, with no further delay. In proof that the show will be ready, the committee say the buildings were at their disposal two days ahead.



N·A·A·M· SHOW COMMITTEE

the committee has been beset at every hand, and with consuming persistency, by the automobile hosts, who evidently evinced a desire to make the Ninth Annual event of this character at Chicago so national in its scope as to represent the high water mark.

The scheme of decoration has been put forward on a most comprehensive basis, departing from the conventional, and following in the footsteps of Dame Nature to the last degree. Nearby Wilmette was drawn upon for enough black oaks to make a forest, to serve as a background for the wares of the 257 exhibitors, and the committee decided that the Annex basement should be devoted to cars rather than to accessories, so that the actual number of exhibitors this year will have fallen below the number which were accommodated when last the show was there. This difference comes from the mere fact that automobiles take up more room, but it was deemed expedient to make an abiding place for as many automobile exhibits as possible, even though to the detriment of the accessory division. Some of the

accessory makers, having failed to successfully negotiate positions for themselves, were able to double up with their more fortunate neighbors. The Pittsfield Spark Coil Company, for illustration, are in this class, they having procured a position by annexing part of two separate allotments in the gallery, and by the simple process of pre-empting the unused space which forms a strip on the two sides of the party line.

When the show opens, considering the situation as it stands, the Holzman Automobile Company, of Chicago, will probably be the only concern which will fail to put in an appearance, which action on the part of this company is due to its having gone into the hands of a receiver after making application for space. The waiting list numbers about 130 separate applicants for space, and after having squeezed in four makes of cars, putting them in the basement, Manager Miles seems to have reached the conclusion that ingenuity no longer applies. The four additional makes of cars which were accommodated by dint of an excessive display of ingenuity were the Diamond T Motor Car Company, Monitor Auto Works and A. C. Clark Carriage Company, all of Chicago, and the Springfield Motor Car Company, of Springfield, Ill.

The entire situation, summed up in a word, portrays a condition of the utmost harmony, and the consensus of opinion as voiced by all who have had dealings with the committee leads but to the one conclusion, i.e., the undertaking is a large one, and it demanded treatment at the hands of veterans, which it received without stint.

The members of the committee, as pictured here, are so well and favorably known to the automobile fraternity and the wide world that introduction would be absurdly superfluous. Chairman A. L. Pope, in his collaboration on this occasion, has rendered up his customary distinguished services, and the veteran of the Winton plant, Thos. Henderson, lent the guiding influence of a steady hand, which was none the less potent due to the presence of Wm. E. Metzger on the committee.

The prospects of a successful run for the show are assured, in view of the wide interest which is taken by the citizens at large, which is backed up by the "Old Guard" of autoists of which Chicago and vicinity numbers a legion. As a further evidence of the wide interest taken, the Central Passenger Association has granted a rate of one and one-half fares to all visitors to the Chicago show, provided that no fewer than 1,000 present their certificates to the railroad authorities at the Coliseum. The rate is granted on account of the convention of the A. A. A., rather than as a direct result of the show holding, but membership in the A. A. A. is not necessary to participation in the benefits.

WHEN the show opens at the Coliseum on the 5th proximo, General Manager Samuel A. Miles will have completed the most stupendous task which was ever undertaken within the confines of the great metropolis of the Middle West. Every inch of available floor space mounting up to 89,000 square feet, will be covered by some interesting phase of the greatest industry known to modern man, not forgetting that it is the self-contained handywork of but ten or eleven consecutive years. The Coliseum and the First Regiment Armory combined are not nearly large enough to hold the aspirants to exhibition honors, and

SOME STATISTICS OF THE CARS

ESTIMATED PRODUCTION BY STATES

States	Cars	Value
Michigan	150,000	\$190,000,000
Ohio	44,000	64,000,000
Indiana	35,000	50,000,000
New York	12,000	39,000,000
Pennsylvania	6,000	15,000,000
Illinois	7,000	12,000,000
Connecticut	4,000	12,000,000
Wisconsin	8,000	11,000,000
Missouri	4,000	10,000,000
Massachusetts	3,000	7,000,000
Scattered	7,000	9,000,000
Total...	280,000	\$419,000,000

COUNTING the value of the automobile industry is a process which must include far more than a mere statement which will give the number of automobiles in process, or which have been made. In the building of an automobile, it is first necessary to mine the ores of which the materials must be fabricated; then, comes the work of fabrication in the steel mills, the processes in the foundries, and the endeavors in the forges. There are intervening matters to be taken into account, one of which item is that of transportation, and it is reoccurring.

With the materials in sight it becomes rational to consider the purchases of land, the erection of buildings, and the designing of the automobile models. Coincident with these activities, is the question of the machine tools, and they must go through a process which is parallel to that of the automobile proper in which the first effort is at the mines, thence to the smelters, and so on down the line, until the propitious time arrives, when the special machine tools as demanded in the building of automobiles may be priced, ordered, and delivered.

The first model of an automobile, even under the most refined conditions, due to much experience on the part of designers, will be likely to foot up to the comfortable sum of \$50,000, which is but the A B C of the undertaking. With the model on the road, and its incongruities noted, it is then wise to undertake the designing of the jigs, tools, special fixtures, by means of which the automobile may be duplicated in quantity, on a basis of interchangeability, bereft of the personal equation, and at a cost which will permit of selling with a difference which will take care of "overhead," selling, and contingent expenses. These fixtures, of which one company alone is the possessor of 90,000, cost all the way from \$500 to \$5,000 apiece, which, added to the cost of patterns (a detail which might readily approach \$100,000 in a decent sized plant) will give a fair insight into the preliminaries of a situation such as this, provided a \$50,000 drawing account is added, and a dead labor value of overhead administration charges is not forgotten in the process.

Occasionally, when advertising, and not infrequently in appar-

ently serious statements elsewhere, the point is made that all these expenses have been obviated in some specially skilled process which ended in a full-fledged automobile. These statements, if not qualified, have a ring of truth, but to see the situation on a broad basis, is to stumble over the fact that some parts maker, or a whole school of them perhaps, sustained the expenses of exploitation, incurred all the cost as above enumerated, and in some measure this is the kernel peeping out of the shell, which tells the story of the accessory maker and the short cut to success.

If, by a specialized process, plans, patterns, templates, gauges, jigs, fixtures, and facilities in general, may be utilized in a dozen undertakings, then, the preliminaries of these undertakings, sev-

OASOLINE PLEASURE CARS

ALCO	American Locomotive Co., Providence, R. I.
AMERICAN	American Motor Car Co., Indianapolis.
AMERICAN SIMPLEX	Simplex Motor Co., Mishawaka.
APPERSON	Apperson Bros. Auto Co., Kokomo, Ind.
ATLAS	Atlas Motor Car Co., Springfield, Mass.
AUBURN	Auburn Automobile Co., Auburn, Ind.
AUSTIN	Austin Automobile Co., Grand Rapids, Mich.
BLACK-CROW	Black Mfg. Co., Chicago, Ill.
BRUSH	Brush Runabout Co., Detroit, Mich.
BUICK	Buick Motor Co., Flint, Mich.
CADILLAC	Cadillac Motor Car Co., Detroit, Mich.
CARTERCAR	Cartercar Co., Pontiac, Mich.
CHADWICK	Chadwick Eng'g Works, Pottstown, Pa.
CHALMERS-DETROIT	Chalmers-Detroit Co., Detroit.
CAMERON	Cameron Car Co., Beverly, Mass.
COLUMBIA	Columbia Motor Car Co., Hartford, Conn.
CORBIN	Corbin Motor Vehicle Corp., New Britain.
DORRIS	Dorris Mfg. Car. Co., St. Louis, Mo.
ELMORE	Elmore Mfg. Co., Clyde, O.
E-M-F	Everitt-Metzger-Flanders Co., Detroit, Mich.
EVERITT	Metzger Motor Co., Detroit, Mich.
FAL CAR	F. A. L. Motor Co., Chicago, Ill.
FRANKLIN	H. H. Franklin Mfg. Co., Syracuse, N. Y.
FULLER	Fuller Buggy Co., Jackson, Mich.
GAETH	Gaeth Automobile Co., Cleveland, O.
GLIDE	Bartholomew Co., Peoria, Ill.
GREAT WESTERN	Great Western Co., Peru, Ind.
HALLADAY	Streator Motor Car Co., Streator, Ill.
HAYNES	Haynes Automobile Co., Kokomo, Ind.
HOLSMAN	Holzman Automobile Co., Chicago, Ill.
HUDSON	Hudson Motor Car Co., Detroit, Mich.
HUPMOBILE	Hupp Motor Car Co., Detroit, Mich.
INTER-STATE	Inter-State Auto Co., Muncie, Ind.
JACKSON	Jackson Automobile Co., Jackson, Mich.
KISSELKAR	Kissel Motor Car Co., Hartford, Wis.
KNOX	Knox Automobile Co., Springfield, Mass.
LAMBERT	Buckeye Mfg. Co., Anderson, Ind.
LION	Lion Motor Car Co., Adrian, Mich.
LOCOMOBILE	Locomobile Co., Bridgeport, Conn.
LOZIER	Lozier Motor Co., New York.
MARMON	Nordyke & Marmon Co., Indianapolis, Ind.
MATHESON	Matheson Motor Co., Wilkesbarre, Pa.
MAXWELL	Maxwell-Briscoe Motor Co., Tarrytown.
MCINTYRE	W. H. McIntyre Co., Auburn, Ind.
MIDLAND	Midland Motor Co., Moline, Ill.
MITCHELL	Mitchell Motor Car Co., Racine, Wis.
MOLINE	Moline Automobile Co., Moline, Ill.
MOON	Moon Motor Car Co., St. Louis, Mo.
MORA	Mora Motor Car Co., Newark, N. Y.
NATIONAL	National Motor Vehicle Co., Indianapolis.
OAKLAND	Oakland Motor Car Co., Pontiac, Mich.
OHIO	Ohio Motor Car Co., S. Cincinnati, O.
OLDSMOBILE	Olds Motor Works, Lansing, Mich.
OVERLAND	Willys-Overland Company, Toledo, O.
PACKARD	Packard Motor Car Co., Detroit, Mich.

ESTIMATED PRODUCTION BY CITIES

Cities	Cars	Value
Detroit, Mich.	90,000	\$100,000,000
Flint, Mich.	40,000	50,000,000
Cleveland, O.	35,000	50,000,000
Indianapolis, Ind.	30,000	45,000,000
Buffalo, N. Y.	6,000	24,000,000
Lansing, Mich.	12,000	19,000,000
St. Louis, Mo.	4,000	10,000,000
Racine, Wis.	6,000	8,000,000
Moline, Ill.	4,000	7,000,000
York, Pa.	3,000	7,000,000
Dayton, O.	3,000	6,500,000
Toledo, O.	5,000	6,000,000
Springfield, Mass.	2,000	5,500,000
Jackson, Mich.	3,000	5,000,000
Scattered	37,000	73,000,000
Total...	280,000	\$419,000,000

erally, will be at a cost somewhat less than the total which might be indicated were each one to operate independently of the other. The advocates of specializing, as accessory makers, claim that they have added materially to the process of standardization, and to the value of the statistics which are now so overgrown that it becomes a difficulty of no small moment to make compilation, and in so far as specialists do add to the stability and value of the product, they are entitled to credit, but all the specialists are not in the accessory plants, nor is a maker of automobiles debarred from specializing merely because the work is confined to the manufacture of a given design of cars.

When the grist comes from the mill, it will be found that the bran and the chaff will be the product as aggregated from the several sets of "stones," and that the statistics of the automobile industry as here briefly put, are the square root of mean

SOME STATISTICS OF THE CARS

square of all the efforts that each little effort will be found in the whole, that none are lost, and that a balanced condition is the real result of this aggregation.

The exhibition of automobile parts and fittings, which is about to be opened as a national event at Chicago, represents, under the circumstances, the whole industry, counting everything from the product of an automatic screw machine to the slab which comes from the hundred-ton press; and it presents in orderly array all the things which are made and which add (taking the present as a basis) \$500,000,000 per annum to the wealth of a nation, spreading the same out into the little increments which may be measured in loaves of bread within the reach of those who find it a daily need, more than it can be

GENERAL REVIEW OF THE INDUSTRY

Estimated Number of Cars for 1910, 280,000
Value of These Cars Approximates \$419,000,000
Their Motors Will Develop 80,000,000 Horsepower
The Cars Will Weigh More Than 300,000 Tons
Altogether They Could Carry 1,200,000 People
End to End They Would Stretch at Least 650 Miles
Capital Invested in Them Totals \$200,000,000
Factories Which Build Them Are Worth \$30,000,000
These Factories Cover 2,500 Acres of Land, Total
The Floor Space Used Is 28,000,000 Square Feet
Machinery and Equipment Is Valued at \$85,000,000
Workmen Employed in the Industry Number 120,000
These Workmen Receive \$80,000,000 Wages Yearly

PEERLESS: Peerless Motor Car Co., Cleveland, O.
PENNSYLVANIA: Penna. Auto-Motor Co., Bryn
Mawr, Pa.
PIERCE-ARROW: Pierce-Arrow Motor Co., Buffalo.
POPE HARTFORD: Pope Mfg. Co., Hartford, Conn.
PREMIER: Premier Motor Car Co., Indianapolis.
PULLMAN: York Motor Car Co., York, Pa.
RAMBLER: T. B. Jeffery & Co., Kenosha, Wis.
REGAL: Regal Motor Car Co., Detroit, Mich.
REO: Reo Motor Car Co., Lansing, Mich.
RICHMOND: Wayne Works, Richmond, Ind.
RICKETTS: Ricketts Auto Works, South Bend.
RIDER-LEWIS: Rider-Lewis Motor Co., Anderson, Ind.
ROYAL TOURIST: Royal Tourist Car Co., Cleveland.
SCHACHT: Schacht Mfg. Co., Cincinnati, O.
SELDEN: Selden Motor Vehicle Co., Rochester, N. Y.
SPEEDWELL: Speedwell Motor Car Co., Dayton, O.
STAVER: Staver Carriage Co., Chicago, Ill.
STEARNS: F. B. Stearns Co., Cleveland, O.
STERLING: Elkhart Motor Car Co., Elkhart, Ind.
STEVENS-DURYEA: Stevens-Duryea Co., Chicopee
Falls.
STODDARD-DAYTON: Dayton M. C. Co., Dayton, O.
STUDEBAKER: Studebaker Auto Co., South Bend.
THOMAS: E. R. Thomas Motor Co., Buffalo, N. Y.
WINTON: Winton Motor Carriage Co., Cleveland.
WHITE: White Company, Cleveland, O.
ZIMMERMAN: Zimmerman Mfg. Co., Auburn, Ind.

COMMERCIAL CARS

ALCO: American Locomotive Co., Providence, R. I.
FRANKLIN: H. H. Franklin Mfg. Co., Syracuse, N. Y.
GRABOWSKY: Grabowsky Power Wagon Co., Detroit.
KNOX: Knox Automobile Co., Springfield, Mass.
PACKARD: Packard Motor Car Co., Detroit, Mich.
POPE HARTFORD: Pope Mfg. Co., Hartford, Conn.
RAPID: Rapid Motor Vehicle Co., Pontiac, Mich.
STUDEBAKER: Studebaker Auto. Co., South Bend.
THOMAS (TAXI): Thomas Motor Co., Buffalo, N. Y.

ELECTRIC PLEASURE CARS

BABCOCK: Babcock Electric Carriage Co., Buffalo.
BAKER: Baker Motor Vehicle Co., Cleveland, O.
COLUMBIA: Columbia Motor Car Co., Hartford, Conn.
DETROIT: Anderson Carriage Co., Detroit, Mich.
R. & L.: Rauch & Lang Carriage Co., Cleveland, O.
STUDEBAKER: Studebaker Auto. Co., South Bend.
WAVERLEY: Waverley Company, Indianapolis, Ind.
WOODS: Woods Motor Vehicle Co., Chicago, Ill.

FOREIGN PLEASURE CARS

BERLIET: Berliet Import Co., Chicago, Ill.
FIAT: Fiat Automobile Co., New York.
RENAULT: Renault Freres Selling Branch, Inc., N. Y.

looked upon in a coupon clipping way by those who are not on speaking terms with the baker for lack of interest.

This same exhibition represents something besides the material things called automobiles. These very statistics carry with them a potential force which is not measured in dollars. The elimination of the horse from streets in metropolitan districts, thins out the staff in the office of the "board of health," reduces the appropriation which is required for purposes of cleaning the streets, suppresses mortality as it is measured by the insurance companies, and in so far as it is possible to estimate the several advantages in dollars merely to enable the mind to grasp the situation, these dollars must be added to the \$500,000,000 already set down as directly due to the automobile industry.

The elimination of the horse as looked upon by the contractor, the grocery man, and the farmer, whose returns are measured in

horses sold, as being a serious evil, may have certain justification, but this damage which may be directly traced to the automobile, and which must be considered in connection with the statistics thereof, has a certain offset, and who can tell if the algebra sum of all the increments above and below zero measure, will be anything but advantageous for all concerned. If the contractor finds himself handicapped by a span of horses, it will be because some other contractor who uses automobiles is beating him out, and if the farmer, who found it profitable to raise horses, does not wish to raise automobiles instead, he will have the more time at his disposal for the purpose of raising wheat, and the automobile plow will permit him to turn up alluvial soil from a far greater depth than ever before with less labor, and for his greater advantage.

The humanitarian will accept the coming of the automobile as being the emancipator of the horse, and he will have in his audience a vast concourse of materialists who will undoubtedly find that the automobile is a machine which only has to be fed when it works, which bows to superior intelligence, whenever that rare condition grasps the guiding lever, and wills the way.

Let us pursue another angle which has its bearing on the statistical side of the review of the automobile. The time was when man in his state of savagery moved out from his communal acreage merely if he discovered that some other community was the possessor of something which he did not find in his own small zone, but as he made slow progress across the face of untrammeled Mother Earth, he had plunder in his heart, and it was a good thing for the possessors of what he wanted that the roads were unimproved, so that the uncivilized plunderer of bygone days was impeded by Nature in just proportion to his lack of intelligence. Wisdom brought the warrior's chariot, and slight improvements in roadways at impassable spots, but since like begets like, it was not profitable, so it was found, to fight for that which could be had for the asking on a basis of trade, and road improvements naturally followed as one of the accessories of a more civilized state.

GEOGRAPHICAL DISTRIBUTION OF PLANTS

Plants	States	Plants	Cities
37	Michigan	23	Detroit, Mich.
28	Indiana	10	Cleveland, O.
28	Ohio	10	Indianapolis
25	New York	8	Chicago, Ill.
19	Illinois	6	Buffalo, N. Y.
17	Pennsylvania	6	Cincinnati, O.
15	Massachusetts	5	New York City
10	Wisconsin	5	Pontiac, Mich.
9	Connecticut	5	St. Louis, Mo.
6	Missouri	4	York, Pa.
3	New Jersey	4	Springfield, Mass.
3	Maryland	3	Philadelphia, Pa.
3	Minnesota	3	Dayton, O.
2	Iowa	3	Reading, Pa.
6	Scattered	3	Hartford, Conn.
		211	Auburn, Ind.

THE N.Y.A.M. SHOW

DETAILS OF CARS ON THE AMERICAN MARKET FOR 1910—AMERICAN GASOLINE PLEASURE CARS

MAKE AND MODEL	H.P.	Cylinders	Bore	Stroke	BODY		MOTOR		COOLING		IGNITION		TRANSMISSION				BEARINGS		TIRES							
					Type	Cyl. Set	Kardesler	Pump	Magnetos	Battery	Type	Speeds	Location	Dress	Shaft	Frame	Shaft 2	110	56	P. steel.	3 plain. Ball.	Ball.	2,000	34x34		
Abbott-Detroit	\$1500	25.6 Tour'g.	5	4	4	4	Pairs.	.....	.....	.....	Spaldorf	Battery.	Pump	Disc.	Sel.	3	Frame.	Shaft 2.	110	56	P. steel.	3 plain. Ball.	Ball.	2,000	34x34
A. B. C. "M"	700	14.5 R'bout.	2	2	4	4	Single.	Tubular.	None.	None.	4 mech.	None.	None.	None.	None.	2-chain.	96	56	Steel.	2 plain.	Roller.	Ball.	1,500	28x3		
A. B. C. "Q"	900	25.6 Surrey.	4	4	4	4	Single.	Tubular.	None.	None.	6 mech.	None.	None.	None.	None.	2-chain.	96	56	Steel.	3 plain.	Roller.	Ball.	1,450	28x3		
Acme	2500	22.5 Tour'g.	5	4	3	4	Block.	Cellular.	Centrif'l.	Bosch.	None.	.....	Pump.	Disc.	Sel.	4	Frame.	Shaft 1.	115	56	P. steel.	3 plain. Ball.	Ball.	2,400	33x4
Adams-Farwell "P"	3000	60.3 R'dster.	4	5	5	5	Single.	Air-c'l'd.	.....	.....	Magneto.	Storage.	3 mech.	3-plate.	Sel.	3	Motor.	1-chain.	120	56	P. steel.	3 plain.	Ball.	2,400	36x4
Adams-Farwell "Q"	3500	60.3 Tour'g.	7	5	5	5	Single.	Air-c'l'd.	.....	.....	Magneto.	Storage.	3 mech.	3-plate.	Sel.	3	Motor.	1-chain.	128	56	P. steel.	3 plain.	Ball.	3,000	36x4
Aico 16	3750	24.8 Land'1't	6	4	100	120	Pairs.	H'comb.	Centrif'l.	Bosch.	None.	.....	Mech.	Disc.	Sel.	3	Frame.	Shaft 2.	104	55	P. steel.	3 plain.	Ball.	.....	32x4
Aico 32	4350	24.8 Land'1't	6	4	100	120	Pairs.	H'comb.	Centrif'l.	Bosch.	None.	.....	Mech.	Disc.	Sel.	3	Frame.	Shaft 2.	112	56	P. steel.	3 plain.	Ball.	.....	32x4
Aico 40	4750	35.8 Tour'g.	7	4	120	150	Pairs.	H'comb.	Centrif'l.	Bosch.	Storage.	4 mech.	Disc.	Disc.	Sel.	4	Frame.	Shaft 2.	126	56	P. steel.	3 plain.	Ball.	.....	36x5
Aico 60	*6000	53.6 Tour'g.	6	120	150	Pairs.	H'comb.	Centrif'l.	Bosch.	Storage.	4 mech.	Disc.	Disc.	Disc.	Sel.	4	Frame.	Shaft 2.	134	55	P. steel.	4 plain.	Ball.	3,900	36x5	
Allen-Kingston	2500	28.9 B. tonn.	5	4	4	4	Pairs.	H'comb.	Centrif'l.	Bosch.	Storage.	6 mech.	Pump.	Cone.	Sel.	4	Frame.	Shaft 2.	117	56	P. steel.	3 plain.	Ball.	2,500	34x4	
Allen-Kingston	4500	44.1 Tour'g.	7	4	5	6	Pairs.	H'comb.	Centrif'l.	Bosch.	Storage.	7 mech.	Cone.	Cone.	Sel.	4	Frame.	Shaft 2.	125	56	P. steel.	3 plain.	Ball.	3,300	34x4	
American	4000	46.0 R'dster.	3	4	5	5	Pairs.	Tubular.	Centrif'l.	Bosch.	Storage.	7 mech.	Cone.	Cone.	Sel.	4	Frame.	Shaft 1.	110	56	P. steel.	3 plain.	Ball.	2,800	40x4	
American	4000	46.0 B. tonn.	7	4	5	5	Pairs.	Tubular.	Centrif'l.	Bosch.	Storage.	7 mech.	Cone.	Cone.	Sel.	4	Frame.	Shaft 1.	124	56	P. steel.	3 plain.	Ball.	2,900	40x4	
American Simplex	4000	† Tour'g.	7	4	5	5	Pairs.	Cellular.	Centrif'l.	Magneto.	Storage.	10 mech.	5-plate.	Sel.	3	Axle.	Shaft 2.	117	56	P. steel.	5 plain.	Ball.	3,800	36x4		
Anchor	1850	28.9 Tour'g.	5	4	4	5	Single.	Tubular.	None.	Remy.	Dry.	.....	Pump.	Cone.	Sel.	3	Axle.	Shaft 1.	110	56	P. steel.	3 plain.	Roller.	2,200	34x34
Anhut	1700	29.3 R'bout.	2	6	3	4	Pairs.	Cellular.	Centrif'l.	Magneto.	Battery.	.....	Pump.	28-disc.	Sel.	3	Motor.	Shaft 2.	110	56	P. steel.	4 plain.	Plain.	Plain.	34x34
Anhut	1800	29.4 B. tonn.	4	6	3	4	Pairs.	Cellular.	Centrif'l.	Magneto.	Battery.	.....	Pump.	28-disc.	Sel.	3	Motor.	Shaft 2.	110	56	P. steel.	4 plain.	Plain.	Plain.	34x34
Apperson 4-30	2000	30.6 Tour'g.	5	4	4	5	Single.	Tubular.	Ecc'c.	Bosch.	Storage.	4 mech.	Con. b'd.	Sel.	3	Frame.	Shaft.	112	56	P. steel.	5 plain.	Ball.	2,700	34x4		
Apperson "O"	2450	30.6 B. tonn.	4	4	4	5	Single.	Tubular.	Ecc'c.	Bosch.	Storage.	4 mech.	Con. b'd.	Sel.	3	Frame.	Shaft.	119	56	P. steel.	5 plain.	Ball.	3,444	34x4		
Apperson 4-40	3000	36.1 Tour'g.	7	4	4	5	Single.	Tubular.	Ecc'c.	Bosch.	Storage.	4 mech.	Con. b'd.	Sel.	3	Frame.	Shaft.	122	56	P. steel.	5 plain.	Ball.	3,634	36x4		
Apperson 4-40	4000	48.4 B. tonn.	7	4	5	5	Single.	Tubular.	Ecc'c.	Bosch.	Storage.	4 mech.	Con. b'd.	Sel.	4	Frame.	Shaft.	116	56	P. steel.	5 plain.	Ball.	3,634	36x4		
Apperson 4-40	4200	48.4 Tour'g.	7	6	4	5	Single.	Tubular.	Ecc'c.	Bosch.	Storage.	6 mech.	Con. b'd.	Sel.	3	Frame.	Shaft.	128	56	P. steel.	5 plain.	Ball.	3,634	36x4		
Atlas F.	2000	† Tour'g.	5	3	4	4	Single.	Tubular.	Centrif'l.	None.	Dry.	7 mech.	Ex. b'd.	Sel.	3	Frame.	Shaft 2.	110	56	P. steel.	4 plain.	Roller.	2,400	34x4		
Atlas G.	2500	† Tour'g.	7	4	5	5	Single.	Tubular.	Centrif'l.	None.	Dry.	9 mech.	Ex. b'd.	Sel.	3	Frame.	Shaft 2.	120	56	P. steel.	5 plain.	Roller.	2,600	36x4		
Atlas H.	2500	† Tour'g.	7	4	5	5	Single.	Tubular.	Centrif'l.	None.	Dry.	9 mech.	Ex. b'd.	Sel.	3	Frame.	Shaft 2.	128	56	P. steel.	5 plain.	Roller.	2,600	36x4		
Auburn X	1650	32.4 Tour'g.	5	4	4	5	Single.	Tubular.	Gear.	Remy.	Dry.	Pump.	Disc.	Sel.	3	Frame.	Shaft 2.	116	56	P. steel.	5 plain.	Ball.	2,500	36x34		
Austin 45	3000	45.9 Tour'g.	5	6	4	5	Pairs.	Cellular.	Centrif'l.	None.	Dry.	7 mech.	Ex. b'd.	Sel.	3	Frame.	Shaft 2.	110	56	P. steel.	4 plain.	Roller.	2,400	34x4		
Austin 50	4500	48.6 Tour'g.	5	6	4	5	Pairs.	Cellular.	Centrif'l.	None.	Dry.	9 mech.	Ex. b'd.	Sel.	3	Frame.	Shaft 2.	120	56	P. steel.	5 plain.	Roller.	2,600	36x4		
Austin 60	*6000	72.6 Tour'g.	7	6	5	5	Single.	.....	.....	.....	.....	.....	.....	.....	.....	4	Frame.	Shaft.	140	56	P. steel.	5 plain.	Ball.	4,500	37x5
Autocar XXII	1800	25.6 Tour'g.	5	4	4	5	Single.	Tubular.	Centrif'l.	Bosch.	Battery.	3 mech.	3-plate.	Prog.	3	Frame.	Shaft 2.	102	56	P. steel.	3 plain.	Roller.	2,400	34x34		
Bebeck 30	2750	27.2 Tour'g.	5	4	4	5	Pairs.	Tubular.	Centrif'l.	Bosch.	Storage.	4 mech.	Pump.	Cone.	Sel.	3	Frame.	Shaft 2.	114	56	P. steel.	3 plain.	Roller.	2,500	34x4	
Bedger B.	1600	25.6 Tour'g.	5	4	4	4	Pairs.	Tubular.	None.	Bosch.	Storage.	4 mech.	Disc.	Disc.	Sel.	3	Motor.	Shaft 1.	112	56	P. steel.	3 plain.	Ball.	2,000	34x34	
Bailey Olympic	2500	† B. tonn.	4	4	5	5	Single.	Tubular.	Centrif'l.	Magneto.	Storage.	4 mech.	Disc.	Disc.	Sel.	3	Frame.	Shaft 1.	112	56	P. steel.	5 plain.	Ball.	2,000	36x4	
Belden B.	4500	48.6 Tour'g.	5	4	4	5	Single.	H'comb.	Centrif'l.	Bosch.	Storage.	5 mech.	Pump.	Pump.	Sel.	4	Frame.	Shaft 1.	132	56	P. steel.	4 plain.	Ball.	3,750	36x4	
Belden B.	6000	60.0 Tour'g.	7	6	5	5	Single.	H'comb.	Centrif'l.	Bosch.	Storage.	5 mech.	Pump.	Pump.	Sel.	4	Frame.	Shaft 1.	136	56	P. steel.	4 plain.	Ball.	3,800	40x4	
Belmont 30	1650	25.6 Tour'g.	5	4	4	5	Single.	H'comb.	Centrif'l.	Bosch.	Storage.	5 mech.	Dry.	Pump.	Cone.	Sel.	3	Frame.	Shaft 1.	110	56	P. steel.	5 plain.	Ball.	2,400	36x34
Bergdorff 30	1500	25.6 Tour'g.	5	4	4	4	Block.	Tubular.	Centrif'l.	Bosch.	Storage.	5 mech.	Disc.	Disc.	Sel.	3	Frame.	Shaft 2.	106	56	P. steel.	2 ball.	Roller.	2,400	36x4	
Berksire E.	2650	35.2 R'dster.	3	4	4	4	Single.	H'comb.	Centrif'l.	Bosch.	Storage.	5 mech.	Disc.	Disc.	Sel.	4	Frame.	Shaft 1.	132	56	P. steel.	5 plain.	Ball.	2,700	36x4	
Berksire E.	2900	35.2 Tour'g.	7	4	3	4	Block.	Tubular.	None.	None.	Remy.	.....	Pump.	Cone.	Sel.	2	Axle.	Shaft.	88	56	P. steel.	5 plain.	Ball.	1,000	32x3
Billy "Tour"	500	18.2 R'bout.	2	4	3	4	Single.	Tubular.	None.	Remy.	.....	Pump.	Disc.	Disc.	Sel.	3	Axle.	Shaft 1.	107	56	P. steel.	5 plain.	Ball.	1,900	32x3
Black-Crow F.	1200	24.0 B. tonn.	4	4	3	4	Single.	Tubular.	None.	Remy.	.....	Pump.	Disc.	Disc.	Sel.	3	Axle.	Shaft 1.	120	56	P. steel.	3 plain.	Roller.	34x4	34x4
Black-Crow M.	1750	28.9 Tour'g.	7	4	4	4	Single.	Tubular.	None.	Remy.	.....	Pump.	Disc.	Disc.	Sel.	3	Axle.	Shaft 1.	120	56	P. steel.	3 plain.	Roller.	3,000	36x4

* Price includes top.

† Two-cycle motor.

‡ Also 60 inches.

THE N.A.A.M. SHOW.

DETAILS OF CARS ON THE AMERICAN MARKET FOR 1910—AMERICAN GASOLINE PLEASURE CARS—(Continued)

MAKE AND MODEL	BODY	MOTOR		COOLING		IGNITION		TRANSMISSION				BEARINGS			TIRES					
		Bore	Stroke	Cyl. Cast	Resistor	Pump	Battery	Lubrication	Speeds	Location	Drives	Wheelbase	Frame	Shaft	Transmission	Width	Front	Rear		
Brush.....	\$ 485	6.4 R'bout.	2	1	4	5	Single. Tubular.	None...	Dry...	Disc...	Plan.	2	Frame.	2-chain.	80	56	Wood...	2 plain.		
Buick "10"	1150	32.5 B. tonn.	4	4	31	31	Pairs. Tubular.	Centrif'l. Remy...	Dry...	Pump...	Plan.	2	Frame.	Shaft 1.	92	56	P. steel...	3 plain.		
Buick "19"	1400	38.9 Tour'g...	5	4	44	44	Pairs. Tubular.	Centrif'l. Remy...	Dry...	Pump...	Conc...	3	Frame.	Shaft 1.	105	56	P. steel...	3 plain.		
Buick "17"	1750	32.4 Tour'g...	5	4	44	5	Pairs. Tubular.	Centrif'l. Remy...	Dry...	Pump...	Conc...	3	Frame.	Shaft 1.	112	56	P. steel...	3 plain.		
Burdick C.....	7000	50.0 Tour'g...	8	6	5	5	Single. H/comb.	Gear...	Bosch...	Storage.	Pump...	4	Frame.	Shaft 2.	142	56	P. steel...	7 plain.		
Cadillac 30.....	1600	28.9 Tour'g...	5	4	44	44	Single. Tubular.	Gear...	Spiled'l.	Dry...	Pump...	2	Frame.	Shaft 2.	110	56	P. steel...	5 plain.		
Cadillac 30.....	3000	35.9 Limous.	7	4	44	44	Single. Tubular.	Gear...	Spiled'l.	Dry...	Pump...	2	Frame.	Shaft 2.	114	56	P. steel...	5 plain.		
Cameron "15"	850	24.0 R'bout.	2	4	31	31	Single. Air-c'l'd.	Centrif'l.	Remy...	Dry...	Pump...	3	Axle...	Shaft 1.	100	56	P. steel...	3 plain.		
Cameron "16"	1100	34.0 Tour'g...	5	4	34	34	Single. Air-c'l'd.	Centrif'l.	Remy...	Dry...	Pump...	3	Axle...	Shaft 1.	104	56	P. steel...	3 plain.		
Cameron "11"	1500	36.1 Tour'g...	6	3	31	31	Single. Air-c'l'd.	Centrif'l.	Remy...	Dry...	Pump...	3	Axle...	Shaft 1.	114	56	P. steel...	4 plain.		
Cartercar H.....	1150	25.6 B. tonn.	4	4	44	44	Pairs. Tubular.	None...	Spiled'l.	Dry...	Pump...	None...	Frame.	1-chain.	100	56	P. steel...	5 plain.		
Cartercar L.....	1600	28.9 Tour'g...	5	4	44	44	Pairs. Tubular.	Centrif'l.	Centrif'l.	Dry...	Pump...	None...	Frame.	1-chain.	110	56	P. steel...	3 plain.		
Chadwick Great Six.....	5500	60.0 Tour'g...	7	6	5	6	Pairs. Cellular...	Centrif'l.	Bosch...	Dry...	14 mech.	Ex. b'd.	4	Frame.	2-chain.	130	56	P. steel...	4 plain.	
Chadwick Great Six.....	6500	60.0 R'bout.	2	6	5	6	Pairs. Cellular...	Centrif'l.	Bosch...	Dry...	14 mech.	Ex. b'd.	4	Frame.	2-chain.	112	56	P. steel...	4 plain.	
Chalmers-Detroit 30.....	1500	25.6 Tour'g...	5	4	44	44	Block. Tubular.	Centrif'l.	Extra...	Storage.	Pump...	Disc...	3	Motor.	Shaft 1.	115	55	P. steel...	2 ball.	
Chalmers-Detroit 40.....	2750	40.0 Tour'g...	5	4	44	44	Pairs. H/comb.	Centrif'l.	Bosch...	Pump...	Pump...	Conc...	3	Frame.	Shaft 2.	123	55	P. steel...	3 plain.	
Cino A.....	2250	30.6 Tour'g...	5	4	48	5	Pairs. Tubular.	Centrif'l.	Remy...	Dry...	3 mech.	Disc...	3	Frame.	Shaft 2.	113	56	P. steel...	3 plain.	
Clark 30.....	1400	25.6 Tour'g...	5	4	44	44	Single. Tubular.	Centrif'l.	Remy...	Dry...	3 mech.	Disc...	3	Frame.	Shaft 2.	110	56	P. steel...	3 plain.	
Coates-Gosban 38.....	2925	32.4 B. tonn.	4	4	48	5	Single. Cellular...	Bosch...	Storage.	Pump...	Pump...	Conc...	3	Frame.	Shaft 2.	118	56	P. steel...	3 plain.	
Colburn M.....	3500	28.9 Tour'g...	5	4	44	44	Pairs. Cellular...	Bosch...	Storage.	Pump...	Pump...	Conc...	3	Frame.	Shaft 2.	116	56	P. steel...	5 plain.	
Cole 38.....	1500	25.6 R'bout.	2	4	44	44	Pairs. Tubular.	None...	Spiled'l.	Dry...	Pump...	Conc...	3	Frame.	Shaft 2.	112	56	P. steel...	3 plain.	
Cole 40.....	1500	25.6 Tour'g...	5	4	44	44	Pairs. Cellular...	Centrif'l.	M. & B...	Storage.	Pump...	Conc...	3	Frame.	Shaft 2.	113	56	P. steel...	3 plain.	
Columbia Mark 48.....	2750	32.4 Tour'g...	5	4	47	47	Pairs. Cellular...	Centrif'l.	Centrif'l.	Remy...	Dry...	60-disc.	3	Axle...	Shaft 1.	116	56	P. steel...	3 plain.	
Continental 30.....	1400	30.6 Tour'g...	5	4	48	48	Block. Cellular...	Centrif'l.	Centrif'l.	Gear...	Bosch...	Dry...	3	Frame.	Shaft 2.	120	56	P. steel...	2 bl. 3 pl.	
Corbin "16".....	2750	32.4 Tour'g...	5	4	44	44	Single. H/comb.	Gear...	Bosch...	Dry...	Pump...	Conc...	3	Frame.	Shaft 2.	117	56	P. steel...	Plain.	
Courier.....	1050	22.3 R'bout.	2	4	34	44	Block. Tubular.	None...	Hercules.	Dry...	Pump...	Conc...	3	Axle...	Shaft 1.	100	56	P. steel...	2 plain.	
Crawford "10".....	1350	28.9 Tour'g...	5	4	44	44	Pairs. Cellular...	Centrif'l.	Remy...	Dry...	Pump...	Conc...	3	Frame.	Shaft 1.	110	56	P. steel...	3 plain.	
Crawford G.....	3000	40.0 Tour'g...	8	4	55	55	Single. Cellular...	Centrif'l.	Remy...	Storage.	Pump...	Disc...	4	Frame.	Shaft 2.	125	56	P. steel...	5 plain.	
Crawford P-G.....	3500	40.0 Tour'g...	8	4	55	55	Single. Cellular...	Centrif'l.	Remy...	Storage.	Pump...	Disc...	4	Frame.	Shaft 2.	130	56	P. steel...	5 plain.	
Grotton-Keston.....	2850	28.9 Surrey...	4	4	44	44	Pairs. Tubular.	None...	Bosch...	Nons...	6 mech.	61-disc.	3	Frame.	Shaft 1.	115	56	P. steel...	3 plain.	
Grotton-Keston.....	3500	28.9 Limous.	6	4	44	44	Pairs. Tubular.	None...	Bosch...	Nons...	6 mech.	61-disc.	3	Frame.	Shaft 1.	130	56	P. steel...	3 plain.	
Cutting 40.....	1650	28.9 Tour'g...	5	4	44	44	Single. Tubular.	None...	Centrif'l.	Magneto.	Battery...	Dry...	3	Frame.	Shaft 2.	115	56	P. steel...	Plain.	
Demet.....	550	10.5 R'bout.	2	2	34	34	Single. Tubular.	None...	Remy...	Dry...	Splash...	Disc...	2	Motor.	Shaft 2.	80	56	P. steel...	2 ball.	
De Tumble "Two".....	650	28.9 Tour'g...	3	4	44	44	Single....	Magneto.	Battery...	None...	Shaft 2.	90	56	Frame.	Shaft 1.	115	56	Wood...	3 plain.	
De Tumble "Two".....	1400	28.9 Tour'g...	4	4	44	44	Single....	Magneto.	Battery...	None...	Shaft 2.	90	56	Frame.	Shaft 1.	112	56	P. steel...	3 plain.	
Detroit-Dearborn.....	1650	27.2 Tour'g...	5	4	44	44	Pairs. Tubular.	None...	Magneto.	2 mech.	Ex. b'd.	Sal...	3	Frame.	Shaft 1.	112	56	P. steel...	3 plain.	
Doris E.....	*2500	28.9 Tour'g...	5	4	44	44	Pairs. Tubular.	Centrif'l.	Bosch...	Dry...	7 mech.	Disc...	3	Motor.	Shaft 2.	110	56	P. steel...	3 plain.	
Eastern.....	1250	20.2 B. tonn.	4	4	38	44	Block...	None...	Choices...	Dry...	6 mech.	Con. b'd.	Sal...	3	Frame.	Shaft 2.	105	56	P. steel...	5 plain.
Elmora 38.....	1750	1 Tour'g...	5	4	44	44	Single. Tubular.	None...	None...	Dry...	6 mech.	Con. b'd.	Sal...	3	Frame.	Shaft 2.	120	56	P. steel...	5 plain.
Elmora 48.....	2500	1 Tour'g...	5	4	44	44	Single. Tubular.	None...	None...	Dry...	6 mech.	Con. b'd.	Sal...	3	Frame.	Shaft 2.	120	56	P. steel...	3 plain.

* Price includes top. † Two-cycle motor. ‡ Also 60 inches.

THE N.A.A.M. SHOW

DETAILS OF CARS ON THE AMERICAN MARKET FOR 1910—AMERICAN GASOLINE PLEASURE CARS—(Continued)

MAKE AND MODEL	Price	BODY			MOTOR		COOLING		IGNITION		TRANSMISSION			BEARINGS			TIRES							
		Spads	H.p.	Type	Stroke	Cyl. Cast	Radius	Pump	Batteries	Magнето	Centrif'l.	Lubrication	Clutch	Type	Speeds	Location	Drive	Frame	Wheeblease	Transmission	Front	Rear		
E-M-P 30.....	\$1250	25.6 Tour'g.	5	4	4	Pairs.	Tubular	Splidif.	Storage.	Splash.	Cone.	Sel.	3	Axle.	Shaft.	108	156	P. steel.	3 plain.	Ball.	1,800	32x34		
Empire 30.....	800	19.6 R'bout.	2	4	3	4	Block.	Tubular	None...	Remy...	Battery.	Splash.	Cone.	2	Frame.	2-chain.	96	56	Armor'd.	2 plain.	.....	1,600	32x34	
Enger A.....	2000	32.4 Tour'g.	5	4	4	5	Pairs.	.....	.....	.....	.....	.....	Sel.	3	Frame.	Shaft.	115	56	P. steel.	3 plain.	.....	.....	34x4	
Everitt 30.....	1350	25.6 Tour'g.	5	4	4	4	Block.	Tubular	Centrif'l.	Magneto.	Dry.	.....	Conc.	3	Axle.	Shaft 1.	110	56	P. steel.	3 plain.	.....	2,200	34x4	
F-A-L-Car.....	1750	27.2 Tour'g.	5	4	4	5	Pairs.	Tubular	Centrif'l.	Magneto.	Battery.	Pump.	Conc.	3	Frame.	Shaft.	116	56	P. steel.	3 plain.	Ball.	1,900	34x4	
Firestone-Columbus.....	25.6 B. tonn.	4	4	4	4	Pairs.	.....	.....	.....	.....	.....	.....	.....	3	Frame.	Shaft 1.	106	50	P. steel.	3 plain.	Ball.	1,750	32x34	
Firestone-Columbus.....	2000	32.4 Tour'g.	5	4	4	4	Pairs.	Cellular.	Centrif'l.	Remy...	Dry.	Pump.	Conc.	3	Frame.	Shaft 1.	120	56	P. steel.	3 plain.	Ball.	2,175	34x4	
Flanders 20.....	750	20.2 R'bout.	2	4	3	4	Block.	Tubular	Centrif'l.	Splidif.	Dry.	.....	Splash.	Conc.	2	Axle.	Shaft 1.	100	156	P. steel.	2 plain.	Ball.	1,200	32x3
Ford T.....	950	22.5 Tour'g.	5	4	3	4	Block.	Tubular	None...	Ford sp.	None...	Splash.	Disc.	Plan.	2	Motor.	Shaft 1.	100	156	P. steel.	3 plain.	Plain.	1,200	30x3
Franklin G.....	1850	18.2 B. tonn.	4	4	3	4	Single.	Air-c'l'd.	Bosch...	None...	4 mech.	Disc.	Sel.	3	Frame.	Shaft 2.	91	53	Wood.	5 plain.	Ball.	1,800	32x34	
Franklin D.....	2800	28.9 Tour'g.	5	4	4	4	Single.	Air-c'l'd.	Bosch...	None...	4 mech.	Disc.	Sel.	3	Frame.	Shaft 2.	106	56	Wood.	5 plain.	Ball.	2,400	36x4	
Franklin K-4.....	3200	18.2 Limous.	5	4	3	4	Single.	Air-c'l'd.	Bosch...	None...	4 mech.	Disc.	Sel.	3	Frame.	Shaft 2.	100	53	Wood.	5 plain.	Ball.	2,250	30x3	
Franklin H.....	3750	43.8 Tour'g.	7	6	4	4	Single.	Air-c'l'd.	Bosch...	None...	6 mech.	Disc.	Sel.	3	Frame.	Shaft 2.	127	56	Wood.	7 plain.	Ball.	2,850	36x4	
Franklin D.....	4000	28.9 Limous.	5	4	4	4	Single.	Air-c'l'd.	Bosch...	None...	4 mech.	Disc.	Sel.	3	Frame.	Shaft 2.	111	50	Wood.	5 plain.	Ball.	2,800	34x4	
Frontenac D.....	3500	36.1 R'dster.	3	4	4	5	Pairs.	H'comb.	Centrif'l.	Bosch...	Dry.	2 mech.	Cone.	Sel.	3	Frame.	Shaft 2.	124	50	P. steel.	3 plain.	Ball.	2,900	34x4
Frontenac C.....	3500	36.1 Tour'g.	7	4	4	5	Pairs.	H'comb.	Centrif'l.	Bosch...	Dry.	2 mech.	Disc.	Sel.	3	Frame.	Shaft 2.	124	50	P. steel.	3 plain.	Ball.	3,300	36x4
Fuller A-2.....	1500	25.6 Tour'g.	5	4	4	4	Single.	Tubular	Gear...	Choice...	Dry...	Pump...	Disc.	Plan.	2	Frame.	Shaft 1.	110	56	Armor'd.	5 plain.	Plain.	1,900	32x34
Fuller A.....	2000	32.4 Tour'g.	5	4	4	4	Single.	Cellular	Gear...	Choice...	Dry...	Pump...	Disc.	Plan.	2	Frame.	Shaft 1.	115	56	Armor'd.	5 plain.	Plain.	2,100	32x34
Gaeth XXI.....	3500	38.0 Tour'g.	7	4	4	5	Pairs.	H'comb.	None...	M. & B.	Dry...	4 mech.	Con. b'd.	Sel.	3	Frame.	Shaft 2.	120	56	P. steel.	3 plain.	Ball.	3,200	36x4
Gleason M.....	1000	18.0 Surrey..	4	2	4	4	Single.	Tubular	None...	Remy...	Dry...	2 Mech.	Disc.	Sel.	3	Frame.	Shaft 2.	95	56	P. steel.	2 plain.	Roller.	1,600	36x2
Glide 45.....	2500	36.1 Tour'g.	7	4	4	5	Single.	Cellular	Gear...	Eisem'n.	Storage.	Pump...	Disc.	Sel.	3	Axle.	Shaft 1.	120	56	P. steel.	Plain.	Plain.	3,300	36x4
Great Smith 45.....	2650	32.4 Tour'g.	5	4	4	5	Single.	Tubular	Centrif'l.	Splidif.	Dry...	6 feeds...	23-disc.	Prog.	3	Frame.	Shaft 1.	110	56	Wood.	3 plain.	Roller.	2,600	34x4
Great Western 30.....	1600	28.9 Tour'g.	5	4	4	5	Single.	Tubular	Centrif'l.	Remy...	Battery.	Pump...	Cone.	Sel.	3	Frame.	Shaft 2.	112	56	P. steel.	5 plain.	Plain.	3,200	36x4
Groult 40.....	*2500	36.1 Tour'g.	5	4	4	5	.....	H'comb.	Gear...	Remy...	Dry...	Pump...	Cone.	Sel.	3	Frame.	Shaft 2.	123	56	P. steel.	Plain.	Plain.	3,000	36x4
G. J. G.....	2500	36.1 B. tonn.	4	4	4	5	Pairs.	H'comb.	Centrif'l.	Bosch...	None...	Mech.	Cone.	Sel.	3	Frame.	Shaft 1.	121	56	P. steel.	3 plain.	Ball.	2,600	34x4
Halliday.....	1250	25.6 Tour'g.	5	4	4	4	Single.	Single.	Remy...	Battery.	Battery.	Disc.	Sel.	3	Axle.	Shaft 1.	108	56	P. steel.	5 plain.	Ball.	2,500	34x4	
Halliday.....	1500	25.6 Tour'g.	5	4	4	4	Single.	Single.	Bosch...	Battery.	Battery.	Disc.	Sel.	3	Frame.	Shaft 1.	110	56	P. steel.	5 plain.	Ball.	2,500	34x4	
Haynes "19".....	*2000	28.9 Tour'g.	5	4	4	5	Pairs.	Cellular	Gear...	Splidif.	Dry...	Pump...	Con. b'd.	Sel.	3	Motor.	Shaft 2.	110	56	P. steel.	3 plain.	Roller.	2,500	34x4
Henry 35.....	1750	27.2 Tour'g.	5	4	4	5	Pairs.	H'comb.	Centrif'l.	Splidif.	Dry...	Pump...	63-disc.	Sel.	3	Frame.	Shaft 1.	116	56	P. steel.	3 plain.	Ball.	2,500	34x4
Herreshoff.....	1650	18.2 Tour'g.	5	4	3	4	Pairs.	Tubular	None...	Bosch...	Storage.	Pump...	Cone.	Sel.	3	Motor.	Shaft 1.	100	56	P. steel.	3 plain.	Ball.	1,750	32x34
Houpt.....	48.4	4 Tour'g.	7	4	5	6	Pairs.	H'comb.	Centrif'l.	Centrif'l.	.....	.....	4	Frame.	Shaft.	127	56	P. steel.	3 plain.	Ball.	3,100	36x4		
Houpt.....	72.6	Tour'g.	7	6	5	6	Pairs.	H'comb.	Centrif'l.	Centrif'l.	.....	.....	4	Frame.	Shaft.	140	56	P. steel.	4 plain.	Ball.	3,900	36x4		
Hudson 20.....	1000	22.5 R'dster.	3	4	3	4	Block.	Tubular	Extra.	Dry.	Pump...	Cone.	Sel.	3	Frame.	Shaft 1.	100	56	P. steel.	2 plain.	Plain.	1,800	32x34	
Hudson 20.....	1150	22.5 Tour'g.	5	4	3	4	Block.	Tubular	Centrif'l.	Extra.	Dry.	Pump...	Cone.	Sel.	3	Frame.	Shaft 1.	110	56	P. steel.	2 plain.	Plain.	2,000	32x34
Hupmobile B.....	750	16.9 R'bout.	2	4	3	4	Pairs.	Tubular	None...	Bosch...	None...	Splash...	Disc.	Sel.	2	Motor.	Shaft 1.	86	156	P. steel.	3 plain.	Plain.	1,100	30x3
Illinois.....	1250	25.6 Tour'g.	5	4	4	4	Single.	Air-c'l'd.	.....	Remy...	Dry...	Pump...	Cone.	Plan.	2	Frame.	Shaft 1.	107	56	P. steel.	5 plain.	Roller.	2,000	32x34
Inter-State 40.....	1750	32.4 Tour'g.	5	4	4	5	Pairs.	Cellular.	Centrif'l.	U. & H.	Dry.	Pump...	63-disc.	Sel.	3	Shaft.	Shaft 1.	118	56	P. steel.	3 plain.	Ball.	2,700	34x4
Jackson 30.....	1250	25.6 Tour'g.	5	4	4	4	Single.	H'comb.	None...	Splidif.	Dry...	Splash...	Cone.	Sel.	3	Motor.	Shaft 1.	105	56	P. steel.	5 plain.	Ball.	1,950	32x34
Jackson 40.....	1750	32.4 Tour'g.	5	4	4	4	Single.	H'comb.	None...	Splidif.	Dry...	Splash...	Cone.	Sel.	3	Motor.	Shaft 1.	110	56	P. steel.	5 plain.	Ball.	2,650	34x4
Jackson 40.....	2350	36.1 Tour'g.	5	4	4	4	Single.	H'comb.	None...	Splidif.	Dry...	Splash...	Cone.	Sel.	3	Motor.	Shaft 1.	120	56	P. steel.	5 plain.	Ball.	2,850	36x4

* Price includes top. † Two-cycle motor. ‡ Also 60 inches.

THE N.A.A.M. SHOW.

DETAILS OF CARS ON THE AMERICAN MARKET FOR 1910—AMERICAN GASOLINE PLEASURE CARS—(Continued)

MAKE AND MODEL	Price	H.p.	Type	Sects	Cyl. Cast	Bore	Stroke	Motor	BODY		COOLING		IGNITION		TRANSMISSION				BEARINGS			TIRES							
									Radius	Pairs	Pump	Fan	Magnetos	Battery	Lubrication	Type	Cyl.	Cast	Bore	Stroke	Type	Location	Speeds	Type	Front	Transmiss.	Arte	Front	Rear
									Radius	Pairs	Pump	Fan	Magnetos	Battery	Lubrication	Type	Cyl.	Cast	Bore	Stroke	Type	Location	Speeds	Type	Front	Transmiss.	Arte	Front	Rear
Johnson 30	\$1500	28.9	Tour'g.	5	4	4	4	Pairs.	4	4	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Frame...	Shaft 1.	112	56	P. steel...	3 plain...	Ball...	2,200	32x3	32x2		
Johnson 35-40	2500	32.0	Tour'g.	5	5	5	5	Pairs.	5	5	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Frame...	Shaft 1.	112	56	P. steel...	3 plain...	Ball...	2,700	32x4	34x4		
Johnson 50.	3000	40.0	Tour'g.	7	4	5	5	Pairs.	5	5	Extra...	Extra...	Extra...	Extra...	Pump...	Cone...	3	Frame...	Shaft 1.	124	56	P. steel...	3 plain...	Ball...	3,100	36x4	36x4		
Kaufman	1250	25.6	R'dster.	4	4	3	3	Single.	Airc'l'd.	...	Remy.	Dry...	Dry...	Dry...	Dry...	4 mech.	...	3	Axe...	Shaft 1.	104	56	P. steel...	3 plain...	Ball...	1,750	34x3	34x4	
Kemmore	625	...	R'dster.	3	2	...	2	Single.	Airc'l'd.	...	None...	Dry...	Dry...	Dry...	Dry...	Plates.	...	2	M. tor.	Shaft 2.	...	Angle...	2 plain...	Plain.	Roller...	...	28x2	28x2	
Kayne 6-60	2500	48.6	Tour'g.	5	6	4	5	Single.	H'comb.	Centrif'l.	Bosch...	Battery...	Battery...	Battery...	Battery...	Disc...	...	4	Frame...	Shaft 1.	130	56	P. steel...	7 plain...	Ball...	Ball...	...	36x4	36x4
KiseeKar LD 10	1500	28.9	Tour'g.	5	4	4	4	Pairs.	4	4	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Frame...	Shaft 2.	112	56	P. steel...	3 plain...	Ball...	Ball...	...	34x4	34x4	
KiseeKar D 10	2000	38.0	Tour'g.	5	5	4	4	Pairs.	5	4	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Frame...	Shaft 1.	120	56	P. steel...	3 plain...	Ball...	Ball...	...	36x3	36x4	
KiseeKar F 10	2500	38.0	Tour'g.	7	4	4	4	Pairs.	5	4	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Frame...	Shaft 1.	124	56	P. steel...	3 plain...	Ball...	Ball...	...	36x4	36x4	
KiseeKar F 10.	2500	38.0	B. tonn.	7	4	4	4	Pairs.	5	4	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Frame...	Shaft 1.	124	56	P. steel...	3 plain...	Ball...	Ball...	...	40x4	40x4	
KiseeKar G 10.	3000	54.1	Tour'g.	7	6	4	4	Pairs.	7	6	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Frame...	Shaft 2.	132	56	P. steel...	4 plain...	Roller.	Roller...	...	36x4	36x4	
KiseeKar G 10.	3000	54.1	B. tonn.	7	6	4	4	Pairs.	7	6	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Frame...	Shaft 1.	130	56	P. steel...	7 plain...	Ball...	Ball...	...	36x4	36x4	
Kline Kar LD 10	1575	26.8	Tour'g.	5	6	4	5	Single.	Cellular.	Centrif'l.	Bosch...	Battery...	Battery...	Battery...	Battery...	Disc...	...	3	Frame...	Shaft 2.	109	56	P. steel...	5 plain...	Ball...	Ball...	...	34x3	34x3
Kline Kar 4-24	2500	40.0	R'bout	5	6	4	5	Single.	Cellular.	Centrif'l.	Bosch...	Battery...	Battery...	Battery...	Battery...	Disc...	...	3	Frame...	Shaft 1.	108	56	P. steel...	5 plain...	Ball...	Ball...	...	34x4	34x4
Kline Kar 6-40	2500	40.0	Tour'g.	5	6	4	5	Single.	Cellular.	Centrif'l.	Bosch...	Battery...	Battery...	Battery...	Battery...	Disc...	...	3	Frame...	Shaft 1.	122	56	P. steel...	7 plain...	Ball...	Ball...	...	36x4	36x4
Kline Kar S-40	2500	40.0	Tour'g.	5	6	4	5	Single.	Cellular.	Centrif'l.	Bosch...	Battery...	Battery...	Battery...	Battery...	Disc...	...	3	Frame...	Shaft 1.	132	56	P. steel...	4 plain...	Roller.	Roller...	...	40x4	40x4
Knox R.	*3230	40.0	Tour'g.	5	5	4	5	Single.	Cellular.	Centrif'l.	Bosch...	Storage...	Storage...	Storage...	Storage...	Disc...	...	3	Motor...	Shaft 2.	117	56	P. steel...	5 plain...	Ball...	Ball...	...	36x4	36x4
Knox R.	*4000	48.4	Tour'g.	5	5	4	5	Single.	Cellular.	Centrif'l.	Bosch...	Storage...	Storage...	Storage...	Storage...	Disc...	...	3	Motor...	Shaft 2.	127	56	P. steel...	5 plain...	Ball...	Ball...	...	36x5	36x5
Knox S.	*5000	60.0	Tour'g.	5	6	5	4	Single.	Cellular.	Centrif'l.	Bosch...	Storage...	Storage...	Storage...	Storage...	Disc...	...	3	Motor...	Shaft 2.	134	56	P. steel...	7 plain...	Ball...	Ball...	...	4,000	36x5
Kohler 40	1650	32.4	Tour'g.	5	4	4	5	Single.	Cellular.	Centrif'l.	Bosch...	Storage...	Storage...	Storage...	Storage...	Disc...	...	3	Motor...	Shaft 1.	112	56	P. steel...	5 plain...	Roller.	Roller...	...	34x3	34x3
K-R-I-T.	850	22.5	B. tonn.	4	3	4	3	Block.	Tubular.	None...	Bosch...	Splash...	Splash...	Splash...	Splash...	Disc...	...	2	Motor...	Shaft 1.	96	56	P. steel...	2 ball...	Ball...	Ball...	...	32x3	32x3
Lambert "17"	900	25.6	R'bout	2	4	4	4	Block.	Tubular.	None...	Magneto.	Dry...	Pump...	Pump...	Pump...	Disc...	...	1	Chain...	100	56	P. steel...	2 plain...	Roller.	Roller...	...	30x3	30x3	
Lambert "18"	1200	27.2	B. tonn.	4	4	4	4	Block.	Tubular.	None...	Magneto.	Dry...	Pump...	Pump...	Pump...	Disc...	...	1	Chain...	105	56	P. steel...	2 plain...	Roller.	Roller...	...	32x3	32x3	
Lambert "36"	1275	32.7	Tour'g.	5	5	4	5	Block.	Tubular.	None...	Magneto.	Dry...	Pump...	Pump...	Pump...	Disc...	...	1	Chain...	110	56	P. steel...	3 plain...	Roller.	Roller...	...	32x4	34x4	
Lambert "47"	1700	32.2	Tour'g.	5	5	4	5	Block.	Tubular.	None...	Magneto.	Dry...	Pump...	Pump...	Pump...	Disc...	...	1	Chain...	115	56	P. steel...	5 plain...	Roller.	Roller...	...	34x4	34x4	
Lexington A...	1650	32.4	Tour'g.	5	4	4	5	Single.	Cellular.	Centrif'l.	Extra...	Dry...	Pump...	Pump...	Pump...	Disc...	...	3	Frame...	Shaft 1.	106	56	P. steel...	5 plain...	Ball...	Ball...	...	2,250	34x3
Lexington D...	2500	36.1	Tour'g.	7	4	4	5	Single.	Cellular.	Centrif'l.	Extra...	Dry...	Pump...	Pump...	Pump...	Disc...	...	3	Frame...	Shaft 2.	122	56	P. steel...	5 plain...	Ball...	Ball...	...	3,250	36x4
Lion 40...	1600	32.4	Tour'g.	5	4	4	5	Pairs.	4	4	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Motor...	Shaft 1.	112	56	P. steel...	3 plain...	Roller.	Roller...	...	36x3	36x3	
Locomobile L...	3500	32.4	Tour'g.	5	4	4	4	Pairs.	4	4	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Motor...	Shaft 2.	120	54	P. steel...	3 plain...	Ball...	Ball...	...	34x4	34x4	
Locomobile L...	4500	40.0	Tour'g.	7	4	5	6	Pairs.	4	5	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Motor...	Shaft 1.	123	54	P. steel...	3 plain...	Ball...	Ball...	...	36x4	36x5	
Lorier L.	3500	33.7	Tour'g.	5	6	3	4	Pairs.	4	3	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Motor...	Shaft 1.	116	55	P. steel...	4 ball...	Ball...	Ball...	...	2,900	36x4	
Lorier L.	3500	33.7	Tour'g.	5	6	3	4	Pairs.	4	3	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Motor...	Shaft 1.	124	56	P. steel...	3 ball...	Ball...	Ball...	...	3,500	36x4	
Lorier L.	3500	33.7	Tour'g.	5	6	3	4	Pairs.	4	3	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Motor...	Shaft 1.	131	56	P. steel...	4 ball...	Ball...	Ball...	...	3,000	36x5	
Louverne 540	2000	32.4	Tour'g.	5	4	4	5	Single.	Cellular.	Gear...	Dry...	Dry...	Dry...	Dry...	Dry...	Disc...	...	3	Frame...	Shaft 1.	120	56	P. steel...	5 plain...	Ball...	Ball...	...	2,600	34x4
Marathon...	1500	28.9	Tour'g.	5	4	4	4	Pairs.	4	4	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Axe...	Shaft 1.	112	56	P. steel...	3 plain...	Roller.	Roller...	...	34x3	34x3	
Marion "10"	1850	28.9	Tour'g.	5	4	4	4	Pairs.	4	4	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Axe...	Shaft 1.	112	56	P. steel...	3 plain...	Roller.	Roller...	...	34x4	34x4	
Marion 22	2650	32.4	Tour'g.	5	4	4	5	Pairs.	4	4	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Axe...	Shaft 2.	116	56	P. steel...	3 plain...	Ball...	Ball...	...	2,300	34x4	
Maryland...	2250	28.9	Tour'g.	5	4	4	4	Single.	Cellular.	Gear...	Dry...	Dry...	Dry...	Dry...	Dry...	Disc...	...	3	Frame...	Shaft 2.	116	56	P. steel...	5 plain...	Plain.	Plain...	...	2,700	34x4
Mason...	1250	20.0	Tour'g.	5	2	5	6	Single.	Cellular.	Gear...	None...	Dry...	Dry...	Dry...	Dry...	Disc...	...	Plan. e.	Plan. 2	1-Chain 100	56	P. steel...	2 plain...	Plain.	Plain...	...	32x3	32x3	
Matheson Six...	3000	48.6	Tour'g.	5	6	4	5	Pairs.	4	4	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	53-dic.	Sal. 3	Axe...	Shaft 1.	125	56	P. steel...	4 plain...	Ball...	Ball...	...	36x4	36x4
Matheson Four...	5000	40.0	Tour'g.	7	4	5	6	Single.	Cellular.	M. & B.	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	4	Frame...	2-chain.	128	56	P. steel...	5 plain...	Ball...	Ball...	...	36x5	36x5	
Maxwell AA...	600	12.8	R'bout	2	2	4	4	Single.	Cellular.	None...	Dry...	Dry...	Dry...	Dry...	Dry...	Disc...	...	2	Motor...	Shaft 2.	82	56	P. steel...	2 plain...	Plain.	Plain...	...	1,150	28x3
Maxwell Q...	1000	22.5	B. tonn.	4	4	3	4	Pairs.	4	3	Dry...	Dry...	Dry...	Dry...	Pump...	Cone...	3	Motor...	Shaft 2.	93	56	P. steel...	3 plain...	Plain.	Plain...	...	1,500	30x3	
Maxwell E...	1500	28.9	Tour'g.	5	4	4	4	Single.	Cellular.	None...	Dry...	Dry...	Dry...	Dry...	Dry...	Disc...	...	3	Motor...	Shaft 2.	110	56	P. steel...	5 plain...	Plain.	Plain...	...	2,500	34x4

THE N.A.A.M. SHOW

DETAILS OF CARS ON THE AMERICAN MARKET FOR 1910—AMERICAN GASOLINE PLEASURE CARS—(Continued)

MAKE AND MODEL	H.P. Type	Body Type	Motor Type	COOLING		IGNITION	TRANSMISSION		BEARINGS		TIRES		
				Stroke	Cyl. C. Cyl. C.		Spd.	Ratio	Friction	Transmission	Front Weight	Rear Weight	Front H.P.
McIntyre A-1.....	\$ 600	18.0 R'bout.	2 2 4 4 4 4	Single.	Tubular.	None...	Battery.	Mech...	Disc...	2-chain... Frame... Cone... Sel...	90 156 156 156	Plain... 2 plain... P. steel... 3 plain...	30x3 36x3 37x4
McIntyre M-4.....	1250	27.2 Tour g.	5 4 4 4 4 4	Single.	Tubular.	Centrif'l.	Battery.	Dry...	Pump...	Frame... Shaft... Cone... Sel...	112 115 115 115	Plain... 2 plain... P. steel... 3 plain...	30x3 36x3 37x4
McIntyre M-20.....	1750	28.9 Tour g.	5 4 4 4 4 4	Single.	Tubular.	Centrif'l.	Bosch...	Dry...	Pump...	Frame... Shaft... Cone... Sel...	112 115 115 115	Plain... 2 plain... P. steel... 3 plain...	30x3 36x3 37x4
Mercer C.....	1950	30.6 R'bout.	2 4 4 4 4 4	Pairs.	Tubular.	Centrif'l.	Bosch...	Dry...	Pump...	42-disc... Sel...	116 56 56	Plain... 3 plain... P. steel... 3 plain...	36x4 34x4
Mercer A.....	1950	30.6 Tour g.	2 4 4 4 4 4	Pairs.	Tubular.	Centrif'l.	Bosch...	Dry...	Pump...	42-disc... Sel...	116 56 56	Plain... 3 plain... P. steel... 3 plain...	36x4 34x4
Mett.....	475	9.8 R'bout.	2 2 3 3 3 3	Single.	Air-c'ld.	None...	Bosch...	Splash...	None...	Frame... Shaft... Cone... Sel...	81 56 56	Plain... 2 ball... P. steel... 2 ball...	28x2 28x2
Middleby.....	1250	25.6 Tour g.	5 4 4 4 4 4	Single.	Air-c'ld.	Splitd'l.	Dry...	4 mech...	Prog...	3 Frame... Shaft... Cone... Sel...	108 56 56	Plain... 2 ball... P. steel... 2 ball...	33x4 33x4
Midland L.....	1800	32.4 Tour g.	5 4 4 4 4 4	Pairs.	Tubular.	Centrif'l.	Remy...	Dry...	Pump...	3-plate... Sel...	115 56 56	Plain... 3 plain... P. steel... 3 plain...	2,200 34x4
Midland G-10.....	2250	32.4 Tour g.	5 4 4 4 4 4	Pairs.	Tubular.	Centrif'l.	Remy...	Dry...	Pump...	3-plate... Sel...	118 56 56	Plain... 3 plain... P. steel... 3 plain...	2,700 36x4
Mitchell R.....	1100	28.9 R'bout.	3 4 4 4 4 4	Pairs.	Cellular...	Centrif'l.	Splitd'l.	Dry...	6 mech...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	100 112 112 112 112 112	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	1,800 32x3 34x3 36x4
Mitchell T.....	1350	28.9 Tour g.	5 4 4 4 4 4	Pairs.	Cellular...	Centrif'l.	Splitd'l.	Dry...	6 mech...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	110 120 120 120 120 120	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	2,300 3,300 3,6x4
Mitchell S.....	2000	43.8 Tour g.	5 4 4 4 4 4	Pairs.	Cellular...	Centrif'l.	Splitd'l.	Dry...	8 mech...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	130 130 130 130 130 130	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	3,300 3,6x4
Moline.....	1500	25.6 Tour g.	5 4 4 4 4 4	Pairs.	Tubular.	None...	Solid'l.	Battery.	Pump...	Frame... Shaft... Cone... Sel...	110 56 56	Plain... 3 plain... P. steel... 3 plain...	2,100 34x4
Moline.....	2500	32.4 Tour g.	5 4 4 4 4 4	Pairs.	Tubular.	None...	Solid'l.	Battery.	Pump...	Frame... Shaft... Cone... Sel...	116 56 56	Plain... 3 plain... P. steel... 3 plain...	2,550 36x4
Moon 30.....	1500	28.9 Tour g.	5 4 4 4 4 4	Pairs.	Tubular.	Centrif'l.	Remy...	Dry...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	110 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	2,400 34x4
Moon 46.....	3000	36.1 Tour g.	5 4 4 4 4 4	Pairs.	H comb...	Centrif'l.	Remy...	Dry...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	110 120 120 120 120 120	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	2,850 36x4
Mora 20.....	1050	16.9 R'bout.	2 4 4 4 4 4	Pairs.	Tubular.	None...	Remy...	Dry...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	84 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	1,300 32x3
Mora 40.....	2500	32.4 Tour g.	5 4 4 4 4 4	Pairs.	Tubular.	Centrif'l.	Bosch...	Storage...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	120 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	2,500 34x4
National 40.....	2500	40.0 Tour g.	5 4 5 5 5 5	Pairs.	H comb...	Centrif'l.	Bosch...	Storage...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	124 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	2,850 36x4
National 50.....	4250	48.6 Tour g.	7 6 5 5 5 5	Pairs.	H comb...	Centrif'l.	Bosch...	Storage...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	130 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	3,100 36x4
National 60.....	5000	60.0 Tour g.	7 6 5 5 5 5	Pairs.	H comb...	Centrif'l.	Bosch...	Storage...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	137 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	3,750 36x5
Oakland 25.....	1250	25.6 Tour g.	5 4 4 4 4 4	Pairs.	Tubular.	Centrif'l.	Magneto.	Battery.	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	100 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	1,800 2,250
Oakland K.....	1700	32.4 Tour g.	5 4 4 4 4 4	Pairs.	Tubular.	Centrif'l.	Magneto.	Battery.	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	112 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	2,100 32x3
Ohio 40-A.....	*1850	28.9 Tour g.	5 4 4 4 4 4	Pairs.	Cellular...	None...	Solid'l.	Dry...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	115 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	2,300 34x4
Oldsmobile.....	3000	36.1 Tour g.	5 4 4 4 4 4	Pairs.	H comb...	Centrif'l.	Bosch...	Dry...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	118 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	3,6x4 42x4
Oldsmobile.....	4600	54.1 R'bout.	2 6 6 6 6 6	Pairs.	H comb...	Centrif'l.	Bosch...	Dry...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	118 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	4,250 42x4
Oldsmobile.....	4600	54.1 Tour g.	7 6 4 4 4 4	Pairs.	H comb...	Centrif'l.	Bosch...	Dry...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	130 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	4,250 42x4
Only Car.....	700	... R'bout.	2 1 1 1 1 1	Single...	Bosch...	None...	Bosch...	None...	None...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	104 56 56 56 56 56	Plain... 2 plain... P. steel... 2 plain... P. steel... 2 plain... Ball... Ball... Ball... Ball... Ball... Ball...	... ... ... ... ... ...
Otto 10-A.....	1900	30.6 R'dster.	3 4 4 4 4 4	Pairs.	H comb...	Centrif'l.	Bosch...	Battery.	Pump...	Cone... Shaft... Cone... Sel...	123 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	1,950 34x3
Otto 10-A.....	2000	30.6 Tour g.	5 4 4 4 4 4	Pairs.	H comb...	Centrif'l.	Bosch...	Battery.	Pump...	Cone... Shaft... Cone... Sel...	123 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	2,060 34x4
Overland "38".....	1000	22.5 R'bout.	2 4 4 4 4 4	Single.	Cellular...	None...	Remy...	Dry...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	102 56 56 56 56 56	Plain... 5 plain... P. steel... 5 plain... P. steel... 5 plain...	1,850 32x3
Overland "40".....	1250	28.9 R'bout.	2 4 4 4 4 4	Single.	Cellular...	None...	Remy...	Dry...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	112 56 56 56 56 56	Plain... 5 plain... P. steel... 5 plain... P. steel... 5 plain...	2,100 34x4
Overland "41".....	1400	28.9 Tour g.	5 4 4 4 4 4	Single.	Cellular...	None...	Remy...	Dry...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	112 56 56 56 56 56	Plain... 5 plain... P. steel... 5 plain... P. steel... 5 plain...	2,200 34x4
Overland "42".....	1500	28.9 Limous.	6 4 4 4 4 4	Single.	Cellular...	None...	Remy...	Dry...	Pump...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	112 56 56 56 56 56	Plain... 5 plain... P. steel... 5 plain... P. steel... 5 plain...	2,200 34x4
Packard 18.....	3200	26.4 R'dster.	3 4 4 4 4 4	Pairs.	H comb...	Centrif'l.	Eisem'n.	Storage...	2 mech...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	102 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	2,400 34x3
Packard 18.....	3200	26.4 Tour g.	3 4 4 4 4 4	Pairs.	H comb...	Centrif'l.	Eisem'n.	Storage...	2 mech...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	108 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	2,750 34x4
Packard 30.....	4200	40.0 Tour g.	7 4 5 5 5 5	Pairs.	H comb...	Centrif'l.	Eisem'n.	Storage...	2 mech...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	123 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	3,6x3 36x3
Pelge-Detroit.....	800	† R'bout.	2 3 3 3 3 3	Single.	Tubular.	None...	Magneto.	None...	Cone...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	90 56 56 56 56 56	Plain... 4 plain... P. steel... 4 plain... P. steel... 4 plain...	... ... ... ... ... ...
Pelmer-Singer XXX.....	2250	28.9 R'bout.	3 4 4 4 4 4	Pairs.	H comb...	Centrif'l.	Bosch...	Battery.	Pump...	Frame... Frame... Frame... Frame... Frame... Frame...	115 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	3,4x3 34x4
Pelmer-Singer LXXI.....	3550	54.1 R'dster.	3 6 6 6 6 6	Single.	H comb...	Centrif'l.	Bosch...	Battery.	Pump...	Frame... Frame... Frame... Frame... Frame... Frame...	127 56 56 56 56 56	Plain... 4 plain... P. steel... 4 plain... P. steel... 4 plain...	3,4x4 34x4
Pelmer-Singer LXXII.....	3550	54.1 Tour g.	3 6 6 6 6 6	Single.	H comb...	Centrif'l.	Bosch...	Battery.	Pump...	Frame... Frame... Frame... Frame... Frame... Frame...	127 56 56 56 56 56	Plain... 4 plain... P. steel... 4 plain... P. steel... 4 plain...	3,4x4 34x4
Pelmer-Singer XXX.....	3650	28.9 Limous.	6 4 4 4 4 4	Pairs.	H comb...	Centrif'l.	Bosch...	Battery.	Pump...	Frame... Frame... Frame... Frame... Frame... Frame...	120 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	3,6x4 34x4
Perry 22-36.....	1285	32.4 R'bout.	2 4 4 4 4 4	Pairs.	Tubular.	Centrif'l.	Kurtz...	Dry...	None...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	116 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	3,2x3 34x3
Perry 22-36.....	1485	32.4 Tour g.	2 4 4 4 4 4	Pairs.	Tubular.	Centrif'l.	Kurtz...	Dry...	None...	Shaft... Shaft... Shaft... Shaft... Shaft... Shaft...	116 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	3,2x3 34x3
Paterson 30.....	1400	25.6 Tour g.	5 4 4 4 4 4	Pairs.	Tubular.	None...	Remy...	Dry...	Splash...	Cone... Cone... Sel... Sel...	104 56 56 56 56 56	Plain... 3 plain... P. steel... 3 plain... P. steel... 3 plain...	2,000 32x3

* Price includes top.

† Two-cycle motor.

‡ Also 60 inches.

THE N.A.A.M. SHOW.

DETAILS OF CARS ON THE AMERICAN MARKET FOR 1910—AMERICAN GASOLINE PLEASURE CARS—(Continued)

MAKE AND MODEL	Price	BODY		MOTOR		COOLING		IGNITION		TRANSMISSION		BEARINGS		TIRES						
		Type	Size	Bore	Stroke	Cyl. Cap.	Size	Radiator	Electric	Generator	Location	Drive	Wheelbase	Front	Front	Rear				
Peerless '29*	\$4,500	6	4	4	4	4	4	Pairs.	H'comb.	Gear...	3 mech.	Shaft 2.	113	56	P. steel...	3 plain.				
Peerless '27*	4,300	38.0	R'dster.	3	4	4	4	Pairs.	H'comb.	Gear...	3 mech.	Shaft 2.	118	56	P. steel...	3 plain.				
Peerless '27*	4,300	38.0	Tour'g.	7	4	4	4	Pairs.	H'comb.	Gear...	3 mech.	Shaft 2.	122	56	P. steel...	3 plain.				
Peerless '28*	6,000	57.0	R'dster.	3	6	4	4	Pairs.	H'comb.	Gear...	4 mech.	Shaft 2.	123	56	P. steel...	3 plain.				
Peerless '28*	6,000	57.0	Tour'g.	7	6	4	4	Pairs.	H'comb.	Gear...	4 mech.	Shaft 2.	136	56	P. steel...	3 plain.				
Pennsylvania D 36	2,500	28.9	Tour'g.	5	4	4	4	Pairs.	Cellular	Battery...	Mech...	Axle...	Shaft 1.	110	56	P. steel...	3 plain.			
Pennsylvania C 40	3,000	36.1	Tour'g.	5	4	4	4	Pairs.	Cellular	Battery...	Mech...	Axle...	Shaft 1.	114	56	P. steel...	3 plain.			
Pennsylvania E 40	3,500	36.1	Tour'g.	5	4	4	4	Pairs.	Cellular	Battery...	Mech...	Axle...	Shaft 1.	122	56	P. steel...	3 plain.			
Pennsylvania F Six	4,500	54.1	Tour'g.	5	6	4	4	Pairs.	Cellular	Battery...	Mech...	Axle...	Shaft 1.	129	56	P. steel...	4 plain.			
Petrel	1,350	30.6	R'bout.	2	4	4	4	Pairs.	Cellular	Magneto.	Battery...	Pump...	None...	Fric.	108	56	P. steel...	2-chain.		
Petrel	1,500	30.6	Tour'g.	5	4	4	4	Pairs.	Cellular	Magneto.	Battery...	Pump...	None...	Fric.	113	56	P. steel...	2-chain.		
Pierce-Aceine.....	1,750	28.9	Tour'g.	5	4	4	5	Pairs.	H'comb.	Centrif'l.	Remy...	Dry...	Pump...	39-disc...	Sel...	3	Frame...	Shaft 2.		
Pierce-Aceine 36	3,850	40.0	R'dster.	3	6	4	4	Pairs.	H'comb.	Centrif'l.	Remy...	Dry...	Pump...	Cone...	Sel...	4	Frame...	Shaft 2.		
Pierce-Aceine 36	4,000	38.4	Tour'g.	5	6	4	4	Pairs.	H'comb.	Centrif'l.	Remy...	Dry...	Pump...	Cone...	Sel...	4	Frame...	Shaft 2.		
Pierce-Aceine 45	4,650	48.6	R'dster.	3	6	4	4	Pairs.	H'comb.	Centrif'l.	Remy...	Dry...	Pump...	Cone...	Sel...	4	Frame...	Shaft 2.		
Pierce-Aceine 45	5,000	66.0	Tour'g.	5	6	4	4	Pairs.	H'comb.	Centrif'l.	Remy...	Dry...	Pump...	Cone...	Sel...	4	Frame...	Shaft 2.		
Pierce-Aceine 45	5,850	66.2	R'dster.	3	6	5	5	Pairs.	H'comb.	Centrif'l.	Remy...	Dry...	Pump...	Cone...	Sel...	4	Frame...	Shaft 2.		
Pierce-Aceine 66	6,000	66.2	Tour'g.	7	6	5	5	Pairs.	H'comb.	Centrif'l.	Remy...	Dry...	Pump...	Cone...	Sel...	4	Frame...	Shaft 2.		
Pittsburgh B.....	3,200	54.1	R'dster.	3	6	4	4	Single.	Cellular	Gear...	Bosch...	Dry...	Pump...	Disc...	Sel...	3	Frame...	Shaft 2.		
Pittsburgh C.....	3,200	54.1	B. tonn.	4	6	4	4	Single.	Cellular	Gear...	Bosch...	Dry...	Pump...	Disc...	Sel...	3	Frame...	Shaft 2.		
Pittsburgh D.....	3,600	54.1	Tour'g.	7	6	4	4	Single.	Cellular	Gear...	Bosch...	Dry...	Pump...	Disc...	Sel...	3	Frame...	Shaft 2.		
Pope-Hartford T.....	2,750	29.7	Tour'g.	5	4	4	5	Pairs.	Cellular	Centrif'l.	Extra...	Storage...	4 mech.	Cone...	Sel...	3	Frame...	Shaft 2.		
Powercar.....	1,250	25.6	Tour'g.	3	4	4	4	Single.	Tubeular	None...	Remy...	Dry...	Disc...	Sel...	3	Motor...	Shaft 105			
Premier 4-40.....	2,500	32.4	Tour'g.	5	4	4	5	Pairs.	Cellular	Centrif'l.	M. & B.	Extra...	5 mech.	Disc...	Sel...	3	Frame...	Shaft 120		
Premier 6-60.....	3,500	48.6	Tour'g.	7	6	4	5	Pairs.	Cellular	Centrif'l.	M. & B.	Extra...	7 mech.	Disc...	Sel...	4	Frame...	Shaft 139		
Pullman O.....	16,50	25.6	B. tonn.	4	4	4	5	Single.	Cellular	Centrif'l.	Bosch...	Dry...	Pump...	Cone...	Sel...	3	Frame...	Shaft 108		
Pullman O.....	20,00	32.4	Tour'g.	5	4	4	5	Single.	Cellular	Centrif'l.	Bosch...	Dry...	Pump...	Cone...	Sel...	3	Frame...	Shaft 112		
Pullman O.....	30,00	40.0	R'dster.	3	5	4	5	Single.	Cellular	Centrif'l.	Bosch...	Dry...	Pump...	Cone...	Sel...	3	Frame...	Shaft 116		
Pullman M.....	35,000	44.1	Tour'g.	7	4	5	6	Single.	Cellular	Centrif'l.	Bosch...	Dry...	Pump...	Cone...	Sel...	3	Frame...	Shaft 124		
Rainier.....	4,500	40.0	Tour'g.	5	4	5	5	Pairs.	Cellular	Centrif'l.	M. & B.	...	Pump...	Disc...	Sel...	4	Frame...	Shaft 2.		
Rambler '33*	1,800	32.4	Tour'g.	5	4	4	4	Single.	Tubeular	Centrif'l.	Spiled'l.	Storage...	4 mech.	Cone...	Sel...	3	Shaft...	Shaft 108		
Rambler '33*	2,250	40.0	Tour'g.	7	4	5	5	Single.	Tubeular	Centrif'l.	Spiled'l.	Storage...	4 mech.	Ex. b'd.	Sel...	3	Shaft...	Shaft 112		
Rambler '33*	2,500	40.0	Tour'g.	7	4	5	5	Single.	Tubeular	Centrif'l.	Spiled'l.	Storage...	4 mech.	Ex. b'd.	Sel...	3	Shaft...	Shaft 116		
Ranger D.....	3,95	13.2	R'bout.	2	2	4	4	Single.	Air-c'l'd.	None...	Dry...	4 mech.	Disc...	Plan...	2	Frame...	2-chain.			
Regal 30.....	1,250	25.6	Tour'g.	5	4	4	4	Pairs.	Tubeular	None...	Remy...	Dry...	Pump...	Cone...	Sel...	3	Frame...	Shaft 107		
Regal 40.....	1,750	25.6	Tour'g.	7	4	4	4	Pairs.	Tubeular	None...	Remy...	Dry...	Pump...	Cone...	Sel...	3	Frame...	Shaft 107		
Reo.....	500	9.0	R'bout.	2	1	4	4	Single.	Tubeular	Gear...	None...	Dry...	Splash...	Plate...	2 Motor...	1-chain.	78	155	P. steel...	2 plain.
Reo 10-46.....	1,000	18.0	Tour'g.	5	4	4	4	Single.	Tubeular	Gear...	None...	Dry...	Splash...	Plate...	2 Motor...	1-chain.	115	155	P. steel...	2 plain.
Rilekets G.....	1,250	25.6	Tour'g.	5	4	4	4	Pairs.	Tubeular	Gear...	None...	Dry...	Splash...	Plate...	2 Motor...	1-chain.	108	156	P. steel...	2 plain.
Rider-Lewis.....	1,050	25.6	Tour'g.	5	4	4	4	Block.	Tubeular	None...	Bosch...	None...	Pump...	Cone...	Sel...	3 Axis...	120	56	P. steel...	2 plain.
Royal Tourist M.....	4,500	48.4	Tour'g.	7	4	5	6	Pairs.	H'comb.	Centrif'l.	Magneto.	Storage...	Dry...	Splash...	Ex. b'd.	Plan...	4 Prisms.	126	P. steel...	3 plain.
Saier A.....	1,750	28.9	Tour'g.	5	4	4	4	Pairs.	Tubeular	Centrif'l.	Remy...	Dry...	6 mech.	Plate...	2 Frame...	2-chain.	104	56	P. steel...	2 plain.
Schacht.....	875	31.0	R'bout.	2	2	5	4	Single.	Tubeular	None...	Extra...	Dry...	6 mech.	Plate...	2 Frame...	2-chain.	104	56	P. steel...	2 plain.
Schlosser 24.....	4,500	32.4	Tour'g.	7	4	4	5	Single.	H'comb.	Gear...	Dry...	4 mech.	Disc...	Sel...	4 Frame...	2-chain.	120	56	P. steel...	3 plain.
Sebring.....	2,750	30.5	B. tonn.	6	3	4	4	Pairs.	H'comb.	Centrif'l.	Spiled'l.	Dry...	Pump...	28-disc.	Sel...	3 Frame...	Shaft 1.	120	P. steel...	4 ball.

* Price includes top. † Two-cycle motor. ‡ Also 60 horseps.

THE N.A.A.M. SHOW

DETAILS OF CARS ON THE AMERICAN MARKET FOR 1910—AMERICAN GASOLINE PLEASURE CARS—(Continued)

MAKE AND MODEL	BODY	MOTOR	COOLING	IGNITION	TRANSMISSION				BEARINGS				TIRES								
					Spd.	HP.	Spd.	HP.	Spd.	HP.	Spd.	HP.	Spd.	HP.							
Selden 35T	2000 36.1 Tour.g.	5 4 42	5	Centrif'l.	Pairs.	H'comb.	Extra...	Storage...	Pump...	Cone...	Shaft 1...	1164	56	3 plain.	Roller.	2,650	34x3 ⁴				
Selden 35S	2500 36.1 Tour.g.	5 4 42	5	Centrif'l.	Pairs.	H'comb.	Storage...	Pump...	Cone...	Shaft 2...	122	56	P. steel...	3 plain.	Roller.	2,800	36x4				
Sellers 20	1700 30.6 Tour.g.	5 4 42	5	Pairs.	Tubular.	Centrif'l.	Remy	Dry...	Splash...	3-plate...	Sel...	3	Frame...	Shaft 1...	110	56	3 plain.	Plain.	2,400	34x3 ²	
Sharp-Arrow 40	3000 40.0 R'bout.	2 4	5	Pairs.	Cellular	Centrif'l.	Bosch	Dry...	Pump...	Cone...	Shaft 1...	112	56	P. steel...	3 plain.	Ball...	2,500	36x3 ⁴			
Sharp-Arrow 40	3050 40.0 Tour.g.	5 4	5	Pairs.	Cellular	Centrif'l.	Bosch	Dry...	Pump...	Cone...	Shaft 2...	108	56	P. steel...	3 plain.	Ball...	2,700	36x4			
Simplex 50	3000 40.0 Extra...	2 4	5	Pairs.	H'comb.	Centrif'l.	Bosch	None...	Mech...	Disc...	Shaft 1...	108	56	P. steel...	3 plain.	Ball...	2,800	36x4			
Simplex 50	4450 53.0 Extra...	4	5	Pairs.	H'comb.	Centrif'l.	Bosch	None...	Mech.	Disc...	Shaft 2...	124	56	P. steel...	3 plain.	Ball...	2,850	36x5			
Speedwell 50	2500 40.0 Tour.g.	5 4	5	Pairs.	H'comb.	Centrif'l.	Bosch	Storage...	4 mech.	Cone...	Shaft 1...	129	56	P. steel...	3 plain.	Ball...	2,600	36x4			
Spoerer B	3000 38.0 Tour.g.	7	4	42	Pairs.	H'comb.	Centrif'l.	Bosch	Battery	Pump...	Cone...	Shaft 2...	118	56	P. steel...	3 plain.	Ball...	2,950	36x4		
Springfield 10-G	2500 40.0 Tour.g.	5	4	42	Pairs.	H'comb.	Centrif'l.	Bosch	Storage...	Mech...	Cone...	Shaft 2...	1264	56	P. steel...	3 plain.	Ball...	2,400	36x4		
Springfield 10-H	2500 40.0 Tour.g.	7	4	42	Pairs.	H'comb.	Centrif'l.	Bosch	Storage...	Mech.	Cone...	Shaft 2...	128	56	P. steel...	3 plain.	Ball...	2,900	36x4		
Standard Six	3000 48.6 Tour.g.	5	6	42	Pairs.	H'comb.	Centrif'l.	Remy	Dry...	Pump...	Cone...	Shaft 2...	124	56	P. steel...	4 plain.	Ball...	3,200	36x4		
Staver H.	1600 25.6 Tour.g.	5	4	4	Pairs.	Cellular	None...	Splitid f.	Dry...	Splash...	Dry...	Shaft 1...	112	56	P. steel...	3 plain.	Ball...	2,150	34x3 ⁴		
Staver L.	2250 38.4 Tour.g.	5	6	4	Pairs.	Cellular	None...	Splitid f.	Dry...	Splash...	Dry...	Shaft 1...	124	56	P. steel...	4 plain.	Ball...	2,500	36x4		
Stearns 15-30	3200 32.4 Tour.g.	5	4	42	Block.	H'comb.	Centrif'l.	Bosch	Dry...	Pump...	Plate...	Axle...	116	56	P. steel...	3 ball.	Ball...	2,650	34x4		
Stearns 30-60	4600 46.2 B.tonn.	5	4	42	Pairs.	H'comb.	Centrif'l.	Bosch	Dry...	Pump...	Plate...	Frame...	121	56	P. steel...	3 ball.	Ball...	3,200	36x4		
Stearns 30-60	4600 46.2 Tour.g.	7	4	52	Pairs.	H'comb.	Centrif'l.	Bosch	Dry...	Pump...	Plate...	Frame...	124	56	P. steel...	3 ball.	Ball...	3,450	36x5		
Stearns 45-90	4800 46.2 Tour.g.	7	6	52	Pairs.	H'comb.	Centrif'l.	Bosch	Dry...	Pump...	Plate...	Frame...	124	56	P. steel...	3 ball.	Ball...	3,350	36x5		
Stearns 45-90	6500 69.3 Tour.g.	7	6	52	Pairs.	H'comb.	Centrif'l.	Bosch	Dry...	Pump...	Plate...	Frame...	130	56	P. steel...	4 ball.	Ball...	3,050	36x4		
Sterling O.	1750 25.6 Tour.g.	5	4	5	Single	Tubular.	Centrif'l.	Remy	Dry...	4 mech.	Ex. b'd...	Axle...	Shaft 1...	118	56	P. steel...	5 plain.	Ball...	2,500	34x3 ⁴	
Stevens-Duryea XXX	2650 36.1 R'dster.	3	4	42	Pairs.	Cellular	Centrif'l.	Magneto.	Storage...	4 mech.	Plate...	Motor...	Shaft 2...	109	56	P. steel...	3 plain.	Ball...	2,650	36x3 ⁴	
Stevens-Duryea X	2850 36.1 Tour.g.	5	4	42	Pairs.	Cellular	Centrif'l.	Magneto.	Storage...	4 mech.	Plate...	Motor...	Shaft 2...	124	56	P. steel...	3 plain.	Ball...	2,800	34x4	
Stevens-Duryea AA	3200 43.8 Tour.g.	7	6	42	Pairs.	Cellular	Centrif'l.	Magneto.	Storage...	6 mech.	Plate...	Motor...	Shaft 2...	128	56	P. steel...	4 plain.	Ball...	3,100	36x4	
Stevens-Duryea Y	4000 54.1 Tour.g.	6	4	42	Pairs.	Cellular	Centrif'l.	Magneto.	Storage...	6 mech.	Plate...	Prog. 3	Shaft 2...	142	56	P. steel...	4 plain.	Ball...	3,650	36x4	
Stoddard-Dayton 10-H	1500 24.0 R'bout.	2	4	32	Pairs.	Tubular.	Centrif'l.	Splidid f.	Dry...	Mech...	Cone...	Shaft 1...	108	56	P. steel...	3 plain.	Roller.	2,175	32x3 ⁴		
Stoddard-Dayton 10-H	1600 28.0 Tour.g.	5	4	32	Pairs.	Tubular.	Centrif'l.	Pitts'ld.	Dry...	Mech...	Cone...	Shaft 1...	108	56	P. steel...	3 plain.	Roller.	2,500	32x4		
Stoddard-Dayton 10-H	2100 28.0 Tour.g.	5	4	32	Pairs.	Tubular.	Centrif'l.	Bosch	Dry...	Mech...	Cone...	Shaft 1...	116	56	P. steel...	3 plain.	Roller.	2,970	34x4		
Stoddard-Dayton 10-K	2650 36.1 R'dster.	3	4	42	Pairs.	Tubular.	Centrif'l.	Bosch	Dry...	Mech...	Cone...	Shaft 1...	120	56	P. steel...	3 plain.	Roller.	3,110	36x4		
Stoddard-Dayton 10-K	2750 36.1 R'dster.	4	4	42	Pairs.	Tubular.	Centrif'l.	Bosch	Dry...	Mech...	Cone...	Shaft 1...	120	56	P. steel...	3 plain.	Roller.	3,450	36x4		
Stoddard-Dayton 10-P	2800 36.1 Tour.g.	7	4	42	Pairs.	Tubular.	Centrif'l.	Bosch	Dry...	Mech...	Cone...	Shaft 1...	128	56	P. steel...	3 plain.	Roller.	3,550	36x4		
Studebaker G-7	4000 36.1 Tour.g.	7	4	52	Pairs.	Tubular.	Centrif'l.	Bosch	None...	3 mech.	Cone...	Shaft 2...	117 ¹	54	P. steel...	3 plain.	Ball...	3,000	36x4		
Sulfit 900	2800 14.0 Limous.	6	4	75	110	Pairs.	Tubular.	None...	Bosch	None...	2 mech.	Cone...	Shaft 2...	97	55 ¹	P. steel...	3 plain.	Ball...	2,450	32x4	
Thomas M.	*3500 43.8 Tour.g.	5	6	42	Pairs.	H'comb.	Centrif'l.	Bosch	Dry...	9 mech.	3-plate...	Frame...	Shaft 2...	125	56	P. steel...	4 plain.	Ball...	3,650	36x4	
Thomas M.	4000 28.9 Br.m.	6	4	42	Pairs.	H'comb.	Centrif'l.	Bosch	Dry...	6 mech.	3-plate...	Frame...	Shaft 2...	123	56	P. steel...	3 plain.	Ball...	3,270	34x4	
Thomas F.	*3500 43.8 Tour.g.	7	4	52	Pairs.	H'comb.	Centrif'l.	Bosch	Dry...	8 mech.	3-plate...	Frame...	Shaft 2...	127	56	P. steel...	3 plain.	Ball...	3,525	36x4	
Thomas K.	*6000 72.6 Tour.g.	6	5	52	Pairs.	H'comb.	Centrif'l.	Bosch	Dry...	10 mech.	3-plate...	Frame...	Shaft 2...	140	56	P. steel...	7 plain.	Ball...	4,160	36x4	
Traveller E	1250 29.3 Tour.g.	5	4	42	52	Pairs.	Tubular.	Gear...	Extra...	Storage...	4 mech.	Plate...	Plan...	Shaft 1...	112	56	P. steel...	3 plain.	Plain.	2,000	34x3 ⁴
Velie	1800 32.4 Tour.g.	5	4	42	51	Pairs.	H'comb.	Centrif'l.	Splidid f.	Storage...	Pump...	3-plate...	Shaft...	115	56	P. steel...	3 plain.	Roller.	2,750	34x4	
Warren-Detroit 10-A	1100 25.6 R'dster.	3	4	42	Block.	Tubular.	Centrif'l.	Volta...	Dry...	Pump...	Cone...	Shaft 1...	110	56	P. steel...	2 plain.	Plain.	2,000	32x3 ⁴		
Warren-Detroit 10-B	1250 25.6 Tour.g.	5	4	42	Block.	Tubular.	Centrif'l.	Volta...	Dry...	Pump...	Cone...	Shaft 1...	110	56	P. steel...	2 plain.	Plain.	2,100	34x3 ⁴		
Washington A-2	1750 28.9 Tour.g.	5	4	42	Pairs.	Tubular.	None...	Remy	Dry...	Pump...	Disc...	Shaft 2...	112	56	P. steel...	3 plain.	Ball...	2,800	34x4		
Washington B-1	2250 34.2 Tour.g.	5	4	42	51	Pairs.	H'comb.	Gear...	Centrif'l.	Magneto.	Storage...	Axle...	Shaft 1...	130	56	P. steel...	3 plain.	Ball...	2,800	34x4	
Wait A	1850 38.4 B.tonn.	4	6	42	51	Pairs.	H'comb.	Gear...	Centrif'l.	Magneto.	Storage...	Axle...	Shaft 2...	132	56	P. steel...	7 plain.	Roller.	2,200	36x4	
Welch R.	48.4 Tour.g.	7	4	52	6	Block.	H'comb.	Centrif'l.	Magneto.	Storage...	Mech...	Disc...	Shaft 1...	130	56	P. steel...	3 plain.	Ball...	3,600	36x4	

* Price includes top.

THE N.A.A.M. SHOW.

DETAILS OF CARS ON THE AMERICAN MARKET FOR 1910—AMERICAN GASOLINE PLEASURE CARS—(Continued)

MAKE AND MODEL	Price	BODY		MOTOR		COOLING		IGNITION		TRANSMISSION		BEARINGS		TIRES				
		Type	H.p.	Stroke	Cyl. Cast	Pump	Magneto	Battery	Locotion	Speeds	Drive	Wheelbase	Frame	Crankshaft	Axle	Weight	Front	Rear
White G-A	\$2000	22.5 Tour'g.	5	4	34	5	Block	H comb.	Centrif'l.	None...	Pump	Cone	Shaft 2.	110	56	P. steel.	Ball...	32x4
White G-B	2500	22.5 Tour'g.	7	4	34	5	Block	H comb.	Centrif'l.	Bosch	None...	Pump	Shaft 2.	120	56	P. steel.	Ball...	34x4
Wilcox 35	1500	28.9 Tour'g.	5	4	44	5	Pairs.	Tubular.	Centrif'l.	Magneto.	Dry...	Pump	Shaft 2.	115	56	P. steel.	3 plain.	34x3½
Winton 48	3000	48.6 Tour'g.	5	6	44	5	Pairs.	Tubular.	Centrif'l.	Eisem'n.	Storage.	Pump	Shaft 2.	124	56	P. steel.	4 plain.	36x4
Winton 49	4250	60.0 Tour'g.	7	6	55	5	Pairs.	Tubular.	Centrif'l.	Eisem'n.	Storage.	Pump	Shaft 2.	132	56	P. steel.	4 plain.	36x4½
Wisco A	1750	30.6 Tour'g.	5	4	44	44	Pairs.	Tubular.	Centrif'l.	Bosch	Dry...	Pump	Shaft 1.	118	56	P. steel.	3 plain.	34x4
Zimmerman 2-36	1500	28.9 Tour'g.	5	4	44	44	Pairs.	Tubular.	None...	Spitd'l.	Dry...	Pump	Shaft 1.	115	56	P. steel.	3 plain.	34x3½

HIGH-WHEELED AUTOMOBILES

MAKE AND MODEL	Price	BODY		MOTOR		COOLING		IGNITION		TRANSMISSION		BEARINGS		TIRES					
		Type	H.p.	Stroke	Cyl. Cast	Pump	Magneto	Battery	Locotion	Speeds	Drive	Wheelbase	Frame	Crankshaft	Axle	Weight	Front	Rear	
A. B. C. "O"	\$ 900	25.6 Surrey.	4	4	4	4	Pairs.	Tubular.	Centrif'l.	None...	Dry...	6 mech.	None...	2-chain.	96	456	Angle...	2 plain.	36x1½
Bugatti	700	† Surrey.	4	2	34	34	Single	Air-c'l'd.	None...	Dry...	Slash	None...	2 Motor.	Fric...	84	856	Wood...	3 plain.	44x1½
Chase F.	900	† Surrey.	4	3	44	4	Single	Air-c'l'd.	None...	Dry...	Slash	Plate...	Plan.	2	100	56	Armor'd.	4 plain.	40x1½
Eureka F.	750	12.8 Surrey.	4	2	4	4	Single	Tubular.	None...	Star	Dry...	4 mech.	Disc.	Plan.	96	456	Steel...	3 plain.	38x1½
Lincoln D.	1000	25.6 Tour'g.	5	4	4	4	Single	Tubular.	None...	Remy	Dry...	6 mech.	Disc.	Sel.	3	104	P. steel.	5 plain.	36x2½
Holman 4-X	550	12.8 R'bout.	2	2	4	4	Single	Air-c'l'd.	None...	Dry...	2 mech.	None...	2 Motor.	Cable...	65	56	Angle...	2 plain.	42x1½
Holman 9-X	650	12.8 R'bout.	2	2	4	4	Single	Air-c'l'd.	None...	Dry...	2 mech.	None...	2 Motor.	Cable...	80	56	Angle...	2 plain.	40x1½
Holman 11-X	770	12.8 Surrey.	4	2	4	4	Single	Air-c'l'd.	None...	Dry...	2 mech.	None...	2 Motor.	Cable...	92	56	Angle...	2 plain.	40x1½
Holman H-9	850	25.6 R'bout.	2	2	4	4	Single	Air-c'l'd.	None...	Dry...	2 mech.	None...	2 Motor.	Cable...	80	56	Angle...	2 plain.	40x1½
Holman H-11	965	25.6 Surrey.	4	4	4	3	Single	Air-c'l'd.	None...	Dry...	2 mech.	None...	2 Motor.	Cable...	92	56	Angle...	2 plain.	40x1½
McIntyre HH	475	13.6 R'bout.	2	2	4	4	Single	Air-c'l'd.	None...	Dry...	Mech.	Plate...	Plan.	2	69½	Angle...	2 plain.	34x1½	
McIntyre NN	775	18.0 Surrey.	4	2	4	4	Single	Air-c'l'd.	None...	Dry...	Mech.	Plate...	Plan.	2	95	Angle...	2 plain.	34x1½	
Sears	395	7.8 R'bout.	2	2	34	4	Single	Air-c'l'd.	None...	Dry...	Splash	None...	2 plain.	Frame...	72	56	Angle...	2 plain.	36x1½
Worth	575	20.0 R'bout.	2	2	5	5	Single	Air-c'l'd.	None...	Dry...	4 mech.	None...	Fric.	Frame...	88	56	Steel...	2 plain.	36x1½

GASOLINE COMMERCIAL CARS AND TAXICABS

MAKE AND MODEL	Price	BODY		MOTOR		COOLING		IGNITION		TRANSMISSION		BEARINGS		TIRES						
		Type	H.p.	Tons	H.p.	Stroke	Cyl. Cast	Pump	Magneto	Battery	Locotion	Speeds	Drive	Wheelbase	Frame	Crankshaft	Axle	Weight	Front	Rear
A. B. C. "O"	\$ 650	14.5 Deliv'y	1	2	44	4	Single	Air-c'l'd.	None...	Dry...	4 mech.	None...	Fric.	Frame...	2-chain.	96	456	Steel...	2 plain.	36x1½
American Truck M	3500	38.0 Expr'ss.	2	4	44	5	Pairs.	H comb.	Centrif'l.	Bosch	Storage.	10 mech.	Cone	Plan.	2-chain.	132	56	Armor'd.	5 plain.	36x5
American Truck O	4000	38.0 Expr'ss.	3	4	44	5	Pairs.	H comb.	Centrif'l.	Bosch	Storage.	10 mech.	Dic.	Plan.	2-chain.	130	62	Armor'd.	5 plain.	36x4
American Truck L	4500	44.1 Extra...	3	5	44	6	Single	H comb.	Centrif'l.	Bosch	Storage.	10 mech.	Dic.	Plan.	2-chain.	130	62	Armor'd.	5 plain.	36x3½

† Two-cycle motor. ‡ Also 60 inches. d Double tire.

THE N.Y.A.A.M. Show

DETAILS OF CARS ON THE AMERICAN MARKET FOR 1910—GASOLINE COMMERCIAL CARS AND TAXICABS—(Continued)

MAKE AND MODEL	H.P.	Tires	Body	Motor	Cooling	Ignition	TRANSMISSION				BEARINGS				TIRES (Solid)				
							Front	Center	Rear	Front	Center	Rear	Front	Center	Front	Center			
Akco 16	4	3350	24.8 Taxicab	100 Pairs.	Centrif'l.	Bosch	None...	Mech.	Disc...	Shaft 2.	104	55 P. steel.	3 plain.	Ball...	3x2x4	32x3x4			
Akco Truck	4	3500	24.8 Express	100 Pairs.	Centrif'l.	Bosch	None...	Mech.	Disc...	Shaft 2.	110	65 P. Channel.	3 plain.	Ball...	30x5	36x3x4			
Atlas T	2	2400	† Taxicab	4 1/2	4 1/2	Single	Centrif'l.	Bosch	Dry...	5 mech.	Ex. b'd.	56 P. steel.	3 plain.	Roller.	2,600	30x4			
Autocar.	2	2150	18.0 Extra	2 1/2	4 1/2	Single	Centrif'l.	Bosch	Dry...	Mech.	Plate...	97	58 P. steel.	2 plain.	Roller.	2,600	30x4		
Bergeroll.	4	2000	25.6 Taxicab	4	4	Block	Centrif'l.	Bosch	None...	Pump	32-disc.	102	56 P. steel.	2 ball...	Ball...	32x4	32x4x		
Bentley-Detroit A	2	1000	16.9 Del'vy	4	3 1/2	3 1/2	Pairs.	Tubular.	None...	Dry...	2 mech.	Cone...	106	56 P. steel.	3 plain.	Plain.	32x2 1/2	32x3 1/2	
Buffalo E.	2	3500	14.0 Extra	4	4	Block	Centrif'l.	Extra...	Remy	Dry...	2 Motor.	2-chain.	106	56 P. steel.	3 plain.	Plain.	34x2 1/2	34x4	
Buffalo L.	2	2800	11.0 Extra	4	4	Block	Centrif'l.	Magneto.	Battery.	Pump	Cone...	Prog.	3 P. frame.	2-chain.	Channel.	3 plain.	36x3 1/2		
Buffalo M.	2	4250	20.1 Extra	4	4	Block	Centrif'l.	Magneto.	Battery.	Pump	Cone...	Prog.	3 P. frame.	2-chain.	Channel.	3 plain.	36x4		
Carbon.	2	4750	24.8 Extra	4	4	Block	Centrif'l.	Magneto.	Battery.	Pump	Cone...	Prog.	3 P. frame.	2-chain.	Channel.	3 plain.	36x5		
Cartercar.	2	3500	36.1 Truck	3	4	5	Pairs.	Tubular.	None...	Dry...	7 mech.	Plate...	Plan.	2 Frame.	2-chain.	108	64 Channel.	3 plain.	
Chase.	2	2000	28.9 Taxicab	4	4 1/2	4 1/2	Pairs.	Tubular.	Centrif'l.	Spit'd'l.	Dry...	Pump	None...	Fric...	1-chain.	110	56 P. steel.	3 plain.	
Chase.	2	750	† Del'vy	2 1/2	4	4	Single	Air-c'l'd.	None...	Dry...	Splash	Plate...	Plan.	2 Frame.	2-chain.	84	56 P. steel.	3 plain.	
De Dion-Bouton.	2	2250	14.0 Extra	4	75	120 Pairs.	Tubular.	Centrif'l.	Bosch	None...	Pump	3-plate.	Sel.	3 Frame.	2-shaft.	109 1/2	54 P. steel.	3 plain.	
De Dion-Bouton.	2	2300	11.0 Extra	4	66	100 Block.	Tubular.	Centrif'l.	Bosch	None...	Pump	3-plate.	Sel.	3 Frame.	2-shaft.	111	54 P. steel.	3 plain.	
De Dion-Bouton.	2	2800	11.0 Extra	4	66	100 Block.	Tubular.	Centrif'l.	Bosch	None...	Pump	3-plate.	Sel.	3 Frame.	2-shaft.	120	57 P. steel.	2 plain.	
De Dion-Bouton.	2	4250	20.1 Extra	4	90	125 Pairs.	Tubular.	Centrif'l.	Bosch	None...	Pump	3-plate.	Sel.	3 Frame.	2-shaft.	146	66 P. steel.	2 plain.	
De Dion-Bouton.	2	4750	24.8 Extra	4	100	130 Pairs.	Tubular.	Centrif'l.	Bosch	None...	Pump	3-plate.	Sel.	4 Frame.	2-shaft.	154	67 P. steel.	2 plain.	
De Dion-Bouton.	2	5200	35.8 Extra	4	120	130 Single	Tubular.	Centrif'l.	Bosch	None...	Dry...	6 mech.	Con. b'd. Sel.	3 Frame.	Shaft 2.	110	56 P. steel.	5 plain.	
Elmore.	2	2500	† Taxicab	4	4	4	Single	Tubular.	None...	Dry...	Pump	33-disc.	Sel.	3 Frame.	Shaft 1.	106	54 P. steel.	3 plain.	
Ewing.	2	3000	24.0 Taxicab	4	3 1/2	4 1/2	Pairs.	H'comb.	Centrif'l.	Magneto.	None...	Pump	33-disc.	Sel.	3 Frame.	Shaft 1.	106	54 P. steel.	3 plain.
Ford T.	2	1100	22.5 Taxicab	4	3 1/2	4	Block	Tubular.	None...	Ford S'L.	None...	Splash	Disc...	Plan.	2 Motor.	Shaft 1.	100	156 P. steel.	3 plain.
Franklin L-1	2	2000	18.2 Extra	4	3 1/2	4	Single	Air-c'l'd.	Bosch	None...	4 mech.	Disc...	Sel.	3 Frame.	Shaft 2.	83	53 1/2 P. wood.	5 plain.	
Franklin L-2	2	2200	18.2 Extra	4	3 1/2	4	Single	Air-c'l'd.	Bosch	None...	4 mech.	Disc...	Sel.	3 Frame.	Shaft 2.	83	53 1/2 P. wood.	5 plain.	
Franklin J-3	2	2500	18.2 Extra	4	3 1/2	4	Single	Air-c'l'd.	Bosch	None...	4 mech.	Disc...	Sel.	3 Frame.	Shaft 2.	100	53 1/2 P. wood.	5 plain.	
Frayet-Miller.	2	30.6	6.0 Various	1	4	5	Single	Air-c'l'd.	Bosch	None...	Dry...	8 mech.	Disc...	Sel.	4 Frame.	2-chain.	108	56 P. steel.	3 plain.
Frayet-Miller.	2	30.6	6.0 Various	1	4	5	Single	Air-c'l'd.	Bosch	None...	Dry...	8 mech.	Disc...	Sel.	4 Frame.	2-chain.	120	60 P. steel.	2 plain.
Frontenac F.	2	3500	40.0 Extra	3	4	5	Pairs.	H'comb.	Centrif'l.	Magneto.	Dry...	2 mech.	Cone...	3 Frame.	2-chain.	122 1/2	58 Channel.	3 plain.	
Grobowski 101-A	2	2300	24.2 Panel	1	2	5	Single	Tubular.	None...	Extra...	Storage.	4 mech.	Cone...	Plan.	2 Frame.	2-chain.	102	56 P. steel.	2 plain.
Grobowski 513-A	2	2750	24.2 Screen	1 1/2	2	5	Single	Tubular.	None...	Extra...	Storage.	4 mech.	Cone...	Plan.	2 Frame.	2-chain.	127	56 P. steel.	2 plain.
Grobowski 505-A	2	3050	24.2 Truck	2	2	5	Single	Tubular.	None...	Extra...	Storage.	4 mech.	Cone...	Plan.	2 Frame.	2-chain.	127	56 P. steel.	2 plain.
Grobowski 507-A	2	3500	28.8 Truck	2	2	6	Single	Tubular.	None...	Extra...	Storage.	4 mech.	Cone...	Plan.	2 Frame.	2-chain.	127	60 P. steel.	2 plain.
Gramm-Logan Y	2	1800	25.6 Del'vy	2	4	4	Pairs.	Tubular.	Centrif'l.	Spit'd'l.	Storage.	Pump	Disc...	Prog.	2 Frame.	2-chain.	120	56 Angle...	3 plain.
Gramm-Logan X.	2	2500	28.9 Truck	2	4	4	Single	Air-c'l'd.	None...	Spit'd'l.	Storage.	Pump	Disc...	Prog.	2 Frame.	2-chain.	120	56 Angle...	3 plain.
Hart-Kraft B	2	1150	16.2 Extra	2	4	4	Single	Tubular.	None...	Spit'd'l.	Dry...	Splash	Disc...	Plan.	2 Motor.	2-chain.	90	56 Angle...	2 ball...
Hewitt.	2	3000	24.2 Truck	2	4	4	Single	Tubular.	None...	Mech.	Cone...	Plan.	2 Frame.	2-chain.	112	60 Channel.	2 plain.	Plain.	
Hewitt.	2	5250	28.9 Truck	2	4	4	Single	Tubular.	None...	Mech.	Cone...	Plan.	2 Frame.	2-chain.	140	68 Channel.	3 plain.	Plain.	
Holman 14-M.	2	700	12.8 Del'vy	2	4	4	Single	Air-c'l'd.	None...	Dry...	2 mech.	None...	Fric...	2 Motor.	Cable...	92	56 Angle...	2 ball...	
Holman H-14.	2	900	25.6 Del'vy	2	4	4	Single	Tubular.	None...	Magneto.	Dry...	2 mech.	None...	Fric...	2 Motor.	Cable...	92	56 Angle...	2 ball...
Kline Kar	2	1400	13.4 Del'vy	2	4	5	Single	Tubular.	None...	Magneto.	Dry...	2 Frame.	2-chain.	86	56 Angle...	2 plain.	Plain.		

† Two-cycle motor.

‡ Also 60 inches.

x Pneumatic Tires.

d Double tires.

THE N.Y.A.A.M. SHOW,

DETAILS OF CARS ON THE AMERICAN MARKET FOR 1910—GASOLINE COMMERCIAL CARS AND TAXICABS—(Continued)

MAKE AND MODEL	H.P.	Tons	Cylinders	Stroke	Cyl. Cast	Radiator	Pump	Generator	Battery	Ignition	TRANSMISSION				BEARINGS							
											Gears	Shafts	Clutch	Transmission	Front	Wheelbase	Frame	Front				
Knox	\$1400	10.0	Extra..	1	5	7	Single	Air-c'd.	None...	Dry...	3 mech..	Plate...	Plan...	2 Frame..	2 chain.	85	16	32x3	36x3			
Knox	2200	20.0	Extra..	1	2	6	Single	Air-c'd.	None...	Dry...	6 mech..	Plate...	Plan...	2 Frame..	2 chain.	97	36	32x1	34x4			
Knox	2600	20.0	Extra..	1	2	5	Single	Cellular	Centrif'l.	None...	Storage.	Pump	3-plate	3 Frame..	2 chain.	100	36	32x1	34x5			
Knox	3500	40.0	Extra..	2	4	4	Single	Cellular	Centrif'l.	None...	Storage.	Pump	3-plate	3 Frame..	2 chain.	125	60	36x3	36x3			
Knox	3750	40.0	Extra..	3	4	5	Single	Cellular	Centrif'l.	None...	Storage.	Pump	3-plate	3 Frame..	2 chain.	149	67	36x3	36x4			
Knox	4000	48.4	Extra..	4	4	5	Single	Cellular	Centrif'l.	None...	Storage.	Pump	3-plate	3 Frame..	2 chain.	154	67	36x3	36x4			
Knox	4300	48.4	Extra..	4	4	5	Single	Cellular	Centrif'l.	None...	Storage.	Pump	3-plate	3 Frame..	2 chain.	154	67	36x3	36x4			
Manhattan	3500	48.4	Extra..	2	4	5	6	Pairs.	H'comb.	Centrif'l.	Bosch	Dry...	8 mech..	Conc...	3 Frame..	2 chain.	126	68	36x3	36x3		
Manhattan	4000	48.4	Extra..	3	4	5	6	Pairs.	H'comb.	Centrif'l.	Bosch	Dry...	8 mech..	Conc...	3 Frame..	2 chain.	125	68	36x3	36x3		
Manhattan	4250	48.4	Extra..	4	5	6	6	Pairs.	H'comb.	Centrif'l.	Bosch	Dry...	8 mech..	Conc...	3 Frame..	2 chain.	125	68	36x3	36x3		
Manhattan	4800	48.4	Extra..	5	4	6	6	Pairs.	H'comb.	Centrif'l.	Bosch	Dry...	8 mech..	Conc...	3 Frame..	2 chain.	166	72	36x6	36x6		
Martin	1400	16.2	Delivery	1	2	4	4	Single	Tubular.	None...	Remy	Battery.	4 mech..	Con b'd.	2 Motor..	2 chain..	88	56	34x2	34x2		
Martin	1500	16.2	Delivery	1	2	4	4	Single	Tubular.	None...	Remy	Battery.	4 mech..	Con b'd.	2 Motor..	2 chain..	92	56	34x2	34x2		
McIntyre	950	23.0	Delivery	1	2	5	4	Single	Tubular.	None...	Dry...	Mech...	Plate...	Plan...	2 Frame..	2 chain.	95	56	34x2	34x2		
Monitor	1275	20.0	Express	1	2	5	4	Single	Tubular.	None...	Extra...	Storage.	4 mech..	Cone...	2 Frame..	Shaft 1.	100	56	36x3	36x3		
Morgan	3750	40.0	Truck	5	4	5	5	Pairs.	Cellular	Centrif'l.	Magneto.	Battery.	Pump	5-plate	2 Motor..	2 chain..	...	...	36x4	36x4
Packard	3400	32.4	Extra..	3	4	5	5	Pairs.	Cellular	Centrif'l.	Eisen'n.	Storage.	2 mech..	Plate...	Prog.	3 Frame..	2 chain.	144	68	34x4	36x4	
Packard	3400	32.4	Extra..	3	4	5	5	Pairs.	Cellular	Centrif'l.	Eisen'n.	Storage.	2 mech..	Plate...	Prog.	3 Frame..	2 chain.	172	68	34x4	36x4	
Pope-Hartford	29.7	Various	..	4	4	5	5	Pairs.	Cellular	Centrif'l.	Extra...	Storage.	4 mech..	Cone...	3 Frame..	Shaft 2.	130	56	34x5x	34x5x		
Randolph C.	18.0	Various	1	2	4	5	Single	Tubular.	None...	Magneto.	Storage.	Pump	Con b'd.	2 Motor..	3 Frame..	2 chain.	100	56	36x3	36x3		
Randolph D	32.4	Various	2	4	5	5	5	Pairs.	Tubular.	Gear...	Magneto.	Storage.	Pump	Con b'd.	3 Frame..	2 chain.	116	50	36x5	36x5		
Randolph E	32.4	Various	3	4	5	5	5	Pairs.	Tubular.	Gear...	Magneto.	Storage.	Pump	Con b'd.	3 Frame..	2 chain.	132	60	36x4	36x4		
Randolph G	40.0	Various	4	4	5	6	5	Pairs.	Tubular.	Gear...	Magneto.	Storage.	Pump	Con b'd.	3 Frame..	2 chain.	150	68	36x5	36x5		
Rapid	20.0	Various	1	2	5	5	Single	Tubular.	Centrif'l.	None...	Storage.	5 mech..	3-plate	Plan...	2 Frame..	2 chain.	100	56	32x3	32x3		
Rapid	22.0	Various	2	2	5	5	5	Single	Tubular.	Centrif'l.	None...	Storage.	5 mech..	3-plate	Plan...	2 Frame..	2 chain.	111	56	34x4	34x4	
Rapid	36.1	Various	3	4	5	5	5	Single	Tubular.	Centrif'l.	Remy	Storage.	7 mech..	Disc...	3 Frame..	2 chain.	138	68	36x3	36x3		
Rapid	48.4	Various	5	4	5	5	5	5	Pairs.	Tubular.	Centrif'l.	Remy	Storage.	7 mech..	Disc...	3 Frame..	2 chain.	160	68	36x4	36x4	
Reliance G	2750	1	Extra..	2	5	5	5	Single	Cellular	Centrif'l.	None...	Storage.	9 mech..	Disc...	3 Frame..	2 chain.	120	58	36x3	36x3		
Reliance G-3	3100	1	Extra..	2	5	5	5	5	Single	Cellular	Centrif'l.	None...	Storage.	11 mech..	Disc...	3 Frame..	2 chain.	120	58	36x3	36x3	
Reliance H	3500	1	Extra..	3	5	5	5	5	Single	Cellular	Centrif'l.	None...	Storage.	14 mech..	Disc...	3 Frame..	2 chain.	138	63	36x5	36x5	
Reliance H-4	3750	1	Extra..	4	5	5	5	5	Single	Cellular	Centrif'l.	None...	Storage.	14 mech..	Disc...	3 Frame..	2 chain.	138	63	36x5	36x5	
Reliance K	4400	1	Extra..	4	5	5	5	5	5	Single	Cellular	Centrif'l.	None...	Storage.	14 mech..	Disc...	3 Frame..	2 chain.	138	63	36x5	36x5
Rockwell	2330	20.2	Taxicab	4	3	4	5	Block	Cellular	Centrif'l.	Bosch	None...	Pump	5-plate	3 Frame..	Shaft 1.	106	56	34x3	34x3		
Reliance L	2750	1	Extra..	2	5	5	5	5	Single	Cellular	Centrif'l.	None...	Storage.	9 mech..	Disc...	3 Frame..	2 chain.	120	58	36x3	36x3	
Sampson	4500	40.0	Truck	5	4	5	5	5	5	Single	Cellular	Centrif'l.	None...	Storage.	11 mech..	Disc...	3 Frame..	2 chain.	120	58	36x3	36x3
Sampson	5000	40.0	Truck	5	4	5	5	5	5	Single	Cellular	Centrif'l.	None...	Storage.	11 mech..	Disc...	3 Frame..	2 chain.	120	58	36x3	36x3
Saurer	4500	20.1	Extra..	2	4	9	10	Pairs.	H'comb.	Centrif'l.	Eisen'n.	None...	Press...	Diag.	4 Frame..	2 chain..	141	64	36x4	36x4		
Saurer	5500	30.0	Extra..	4	10	140	140	Pairs.	H'comb.	Centrif'l.	Eisen'n.	None...	Press...	Diag.	4 Frame..	2 chain..	153	64	36x5	36x5		
Sultan "500"	2800	14.0	Taxicab	4	7	110	110	Pairs.	Tubular.	None...	Bosch	None...	2 mech..	Conc...	3 Frame..	Shaft 1.	106	56	34x3	34x3		
Schacht B	850	21.0	Delivery	1	2	5	5	5	5	Singl.	Tubular.	None...	Dry...	6 mech..	Plate...	2 Frame..	2 chain.	148	68	36x3	36x3	
Sterling C.	3000	18.2	Taxicab	4	3	4	5	4	4	Block	Tubular.	None...	Bosch	Dry...	3 mech..	Conc...	4 Frame..	2 chain..	153	68	36x3	36x3
Thomas	1800	19.6	Extra..	1	4	5	5	4	4	Block	Tubular.	None...	Bosch	Dry...	3 mech..	Conc...	4 Frame..	2 chain..	112	56	36x3	36x3
United	1700	29.4	Extra..	1	6	5	5	4	4	Block	Tubular.	Centrif'l.	K.W.	Storage.	5 mech..	Conc...	3 Frame..	2 chain..	116	56	36x3	36x3
United	2000	29.4	Extra..	1	6	5	5	4	4	Block	Tubular.	Centrif'l.	K.W.	Storage.	5 mech..	Conc...	3 Frame..	2 chain..	128	60	36x4	36x4
United	2500	25.7	Extra..	2	3	4	5	5	5	Block	Tubular.	Centrif'l.	K.W.	Storage.	5 mech..	Conc...	3 Frame..	2 chain..	134	60	36x4	36x4
United	3000	48.6	Extra..	3	6	4	5	6	5	Block	Tubular.	Centrif'l.	K.W.	Storage.	5 mech..	Conc...	3 Frame..	2 chain..	138	68	36x4	36x4
United	3400	48.6	Extra..	4	4	5	5	6	5	Block	Tubular.	Centrif'l.	K.W.	Storage.	5 mech..	Conc...	3 Frame..	2 chain..	142	68	36x4	36x4
United	4000	72.6	Extra..	5	6	5	6	5	5	Block	Tubular.	Centrif'l.	K.W.	Storage.	5 mech..	Conc...	4 Frame..	Shaft 2.	144	60	36x4x	36x4x

White Two-cycle motor. [†] Also 50-hp. [‡] Also 60 inches. ^{*} Pneumatic tires. ^d Double tires.

THE N.A.A.M. Show

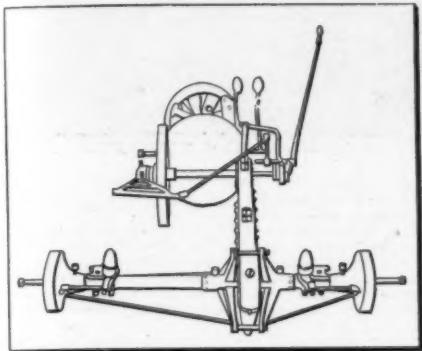
DETAILS OF CARS ON THE AMERICAN MARKET FOR 1910—ELECTRIC PLEASURE CARS

MAKE AND MODEL	BODY	MOTOR	BATTERIES	SPEEDS				BEARINGS			TIRES				
				Speed	H.P.	Cells	Location	Front Reduction	Drive	Frame	Wheels	Transmission	Axle	Front	Rear
Babcock 14	\$2600 Coupe.....	4 One.	5 Middle, Option, 11-plate	36 Divided...	5	1	H'bone gears.	Worm gear...	86	56	Armed...	Ball...	Roller...	2,600	32x4
Bailey	2000 Victoria.....	3 One.	2 ¹ / ₂ Rear...	Edison A 4.....	40	Rear...	Silent chain.	Double chain...	79	56	Angle...	Ball...	Ball...	2,000	34x3 ¹
Bailey	2000 Victoria.....	3 One.	2 ¹ / ₂ Rear...	Exide 11 PV.....	30	Rear...	Silent chain.	Double chain...	79	56	Angle...	Ball...	Ball...	2,000	34x3 ¹
Baker W.	2000 Runabout.....	2 One.	2 Middle.	Exide 11 PV.....	30	Divided...	6	Silent chain.	80	50	Steel...	Ball...	Ball...	1,900	32x3 ¹
Baker V.	2000 Victoria.....	2 One.	2 Middle.	Exide 9 MV.....	28	Divided...	6	Silent chain.	80	50	Steel...	Ball...	Ball...	1,950	32x3 ¹
Baker V.	2400 Coupe.....	2 One.	2 Middle.	Exide 9 MV.....	28	Divided...	6	Silent chain.	80	50	Steel...	Ball...	Ball...	2,100	32x3 ¹
Baker V.	2600 Coupe.....	4 One.	2 Middle.	Exide 9 MV.....	28	Divided...	6	Silent chain.	80	50	Steel...	Ball...	Ball...	2,200	32x3 ¹
Broc D.	2000 Stanhope.....	2 One.	2 Middle.	Exide 11 MV.....	28	Divided...	5	Silent chain.	80	50	Steel...	Ball...	Ball...	1,950	32x3 ¹
Broc D.	2000 Runabout.....	2 One.	2 Middle.	Exide 11 MV.....	30	Divided...	5	Silent chain.	80	50	Steel...	Ball...	Ball...	2,000	32x3 ¹
Broc D.	2200 Coupe.....	3 One.	2 Middle.	Exide 11 MV.....	28	Divided...	5	Silent chain.	80	50	Steel...	Ball...	Ball...	2,150	32x3 ¹
Broc D.	2500 Coupe.....	4 One.	2 Middle.	Exide 11 MV.....	28	Divided...	5	Silent chain.	80	50	Steel...	Ball...	Ball...	2,350	32x3 ¹
Clark	2200 Runabout.....	3 One.	3 ¹ / ₂ Middle.	Niagara 13-plate	28	Divided...	5	None.....	106	56	P. steel...	Ball...	Roller...	2,000	34x3 ¹
Cleveland	2250 Runabout.....	2 One.	3 ¹ / ₂ Middle.	Cuyahoga 9 MV	42	Divided...	6	Chain.....	100	56	Steel...	Ball...	Ball...	2,500	36x4
Cleveland	2500 Victoria.....	4 One.	3 ¹ / ₂ Middle.	Cuyahoga 9 MV	42	Divided...	6	Chain.....	100	56	Steel...	Ball...	Ball...	3,000	36x4
Columbia Mark 70	1600 Victoria.....	2 One.	3 ¹ / ₂ Rear...	Exide 13 PV.....	24	Divided...	6	H'bone gears.	70	48	None...	Ball...	Ball...	1,650	30x3 ¹
Columbus 1000	2000 Stanhope.....	2 One.	2 Middle.	Exide 9 MV.....	24	Divided...	6	Silent chain.	75	50	P. steel...	Ball...	Roller...	3,000	31x4
Columbus 1000	2000 Stanhope.....	2 One.	2 Middle.	Exide 11 MV.....	24	Divided...	6	Silent chain.	75	50	P. steel...	Ball...	Roller...	3,000	31x4
Columbus 1000	2000 Stanhope.....	2 One.	2 Middle.	Exide 11 MV.....	24	Divided...	6	Silent chain.	75	50	P. steel...	Ball...	Roller...	3,000	31x4
Columbus 1000	2000 Stanhope.....	2 One.	2 Middle.	Exide 11 MV.....	24	Divided...	6	Silent chain.	75	50	P. steel...	Ball...	Roller...	3,000	31x4
Detroit H.	1650 Roadster.....	3 One.	3 Middle.	Option, 13 MV.....	24	Divided...	5	Silent chain.	87	51	Angle...	Ball...	Ball...	1,900	32x3 ¹
Detroit A.	1900 Victoria.....	2 One.	3 Middle.	Option, 13 MV.....	24	Divided...	5	Silent chain.	80	51	Angle...	Ball...	Ball...	2,100	32x3 ¹
Detroit E.	2100 Coupe.....	2 One.	3 Middle.	Option, 13 MV.....	24	Divided...	5	Silent chain.	87	51	Angle...	Ball...	Ball...	2,300	32x3 ¹
Detroit C.	2300 Coupe.....	2 One.	3 Middle.	Option, 13 MV.....	24	Divided...	5	Silent chain.	80	51	Angle...	Ball...	Ball...	2,400	32x3 ¹
Detroit D.	2500 Brougham.....	4 One.	3 Middle.	Option, 13 MV.....	24	Divided...	5	Silent chain.	80	51	Angle...	Ball...	Ball...	2,400	32x3 ¹
Ideal	1875 Brougham.....	4 One.	3 Rear...	Exide, 9 plate...	40	Divided...	4	Silent chain.	92	56	Steel...	Ball...	Ball...	2,300	30
Ohio D.	2600 Coupe.....	4 One.	4 Front...	Exide.....	24	Divided...	6	Silent chain.	80	56	Armed...	Ball...	Ball...	2,400	32
Rauch & Lang 20	1900 Stanhope.....	2 One.	2 ¹ / ₂ Middle.	Exide 9 MV.....	24	Divided...	6	Silent chain.	77	53	P. steel...	Ball...	Roller...	1,975	32x3 ¹
Rauch & Lang 22	2100 Stanhope.....	3 One.	2 ¹ / ₂ Middle.	Exide 11 MV.....	24	Divided...	6	Silent chain.	77	53	P. steel...	Ball...	Roller...	2,125	32x3 ¹
Rauch & Lang 133	2100 Stanhope.....	2 One.	2 ¹ / ₂ Middle.	Exide 11 PV.....	24	Divided...	6	Silent chain.	85	53	P. steel...	Ball...	Roller...	2,050	32x3 ¹
Rauch & Lang 22	2200 Victoria.....	4 One.	2 ¹ / ₂ Middle.	Exide 11 MV.....	24	Divided...	6	Silent chain.	85	53	P. steel...	Ball...	Roller...	2,100	32x3 ¹
Rauch & Lang 24	2700 Coupe.....	4 One.	2 ¹ / ₂ Middle.	Exide 13 MV.....	24	Divided...	6	Silent chain.	85	53	P. steel...	Ball...	Roller...	2,550	32x4
Studebaker 22-C	1500 Stanhope.....	2 One.	2 Middle.	Exide 11 plate...	24	Divided...	5	H'bone gears.	67	51	Steel...	Ball...	Ball...	3,000	30x3 ¹
Studebaker 22-G	1800 Coupe.....	2 One.	2 Middle.	Exide 11 plate...	24	Divided...	5	H'bone gears.	67	51	Steel...	Ball...	Ball...	3,000	30x3 ¹
Studebaker 17-D	1700 Stanhope.....	2 One.	2 Middle.	Exide 11 MV.....	24	Divided...	5	H'bone gears.	71	51	Steel...	Ball...	Ball...	3,000	30x3 ¹
Studebaker 17-B	2200 Landaulet.....	2 One.	2 Middle.	Exide 11 MV.....	24	Divided...	5	H'bone gears.	71	51	Steel...	Ball...	Ball...	3,000	30x3 ¹
Studebaker 17-E	2300 Landaulet.....	2 One.	2 Middle.	Exide 11 MV.....	24	Divided...	5	H'bone gears.	71	51	Steel...	Ball...	Ball...	3,000	30x3 ¹
Waverley 69	1225 Runabout.....	2 One.	2 Axle...	Option, 9-plate	30	Divided...	4	H'bone gears.	72	54	Armed...	Ball...	Ball...	3,243	32x3 ¹
Waverley 74	1600 Stanhope.....	2 One.	2 Axle...	Option, 11-plate	30	Divided...	4	H'bone gears.	73 ¹	54	Armed...	Ball...	Ball...	3,243	32x3 ¹
Waverley 74	1700 Roadster.....	2 One.	2 Axle...	Option, 11-plate	32	Divided...	4	H'bone gears.	94	54	Armed...	Ball...	Ball...	3,243	32x3 ¹
Waverley 75	1900 Sury...	4 One.	2 Axle...	Option, 13-plate	35	Divided...	4	H'bone gears.	94	54	Armed...	Ball...	Ball...	3,243	32x3 ¹
Waverley 75	2000 Coupe.....	2 One.	2 Axle...	Option, 11-plate	30	Divided...	4	H'bone gears.	79	54	Armed...	Ball...	Ball...	3,243	32x3 ¹
Waverley 76C	2230 Brougham.....	4 One.	2 Axle...	Option, 13-plate	32	Divided...	4	H'bone gears.	79	54	Armed...	Ball...	Ball...	3,243	32x3 ¹
Woods	2100 Victoria.....	2 One.	2 Middle.	Exide 9 MV.....	40	Divided...	4	H'bone gears.	74	56	Bronze...	Ball...	Ball...	2,650	30x3 ¹
Woods	2650 Brougham.....	4 One.	2 Middle.	Exide 9 MV.....	40	Divided...	4	H'bone gears.	74	56	Bronze...	Ball...	Ball...	2,850	30x3 ¹

NOTE—Due to a lack of space, two pages of tables, including Steam Pleasure and Commercial Cars, Electric Commercial Cars, and Foreign Cars, have been omitted. These two pages will be reproduced in next week's issue of THE AUTOMOBILE, with perhaps some additional pleasure cars.

PROCESS AND PRODUCT

CONSIDERING the dual display of automobiles as they appeared at the two shows in New York, it becomes something of a problem to decide as to the best descriptive matter to offer for the automobiles which will be exhibited at the National Show, under the auspices of the N. A. A. M. in the Coliseum at Chicago. In some ways the Coliseum Show is much more comprehensive than any other exhibition would prove to be, for the



On the Cartercar the drive is by means of frictional discs, thence from the cross shaft to the rear axle by enclosed chain. The cut shows the rear axle construction, the chain-in-oil drive, and the friction transmission, as viewed from the rear. The single lever control is also noticeable, this making for simplicity of operation, as well as simplicity of mechanism. The friction drive allows of as many speeds as there are possible positions.

reason that there is a wider range measured in types of automobiles placed in a comparative relation there.

That exhibitions of automobiles may be of the greatest value to the patrons of the industry is a matter which has long been fairly understood, but it is not always true that these exhibitions accomplish the intended purpose. As an illustration of the point to be made, it is enough to indicate that were all automobiles exactly alike, an exhibition might well be reduced to a single representative of the whole flock, so that unless the display is on a basis which will show the extent of contrast between the several designs, the whole value of the idea will be lost.

The National Show, because it does include a wide variety of types, emanating from the several camps of designers, offers an excellent opportunity to buyers to compare the handiwork of the several schools of design and to determine for themselves the capabilities of the several ideas in view of their wants. It is a matter of absolutely no moment at all as to how good an automobile may be, viewing it in the abstract; its value must be measured in the light of the service required of it by the buyer.

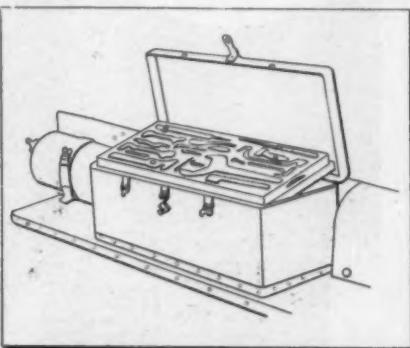
If a hundred separate buyers were to go to the salesrooms of a hundred different makes of automobiles, even conceding that each buyer might find in some one of the cars to be had the very one which would best suit his purpose, it is still within the realm of practical possibility that every one of the hundred aspirants would come away hampered by a car, which, to him, would have all the

avoirdupois of a white elephant. Such is the position in which the average man stands toward the complications (as he thinks) of the average automobile, despite the maker's efforts educationally.

IT IS SCARCELY ENOUGH TO EXAMINE THE AUTOMOBILES

Many of the makers of automobiles go to shows with a polished chassis, which is an excellent way of putting the best foot

All of the useful and dainty little accessories which appeal to the man and woman of refinement are to be found on the Packard cars. The cut shows the tool box as located on the running board of both the "Eighteen" and the "Thirty." It will be noted that the removable tray of the upper part of the tool box has formed compartments or spaces for each and every tool, making it possible to apply, "A place for everything and everything in its place."



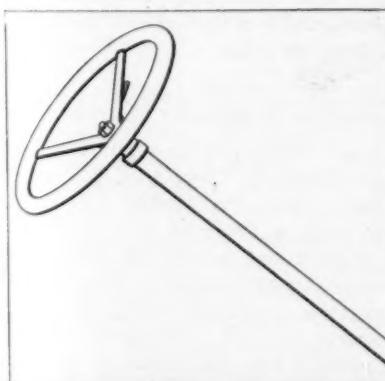
forward. This is not to say that the cars which are shown in the finished state are not provided with a "Sunday foot," but to the average buyer who has no money to waste, seeing is believing, to some extent, at any rate, and if the polished chassis is not to be seen, it becomes necessary to go back of the cars and ascertain how they are made in the shops.

In this treatment, in view of the apparent requirement, it is the idea to show some one feature of the respective makes of automobiles, with the idea of testifying as to the uniformity in the matter of the standard which has been set in the engineering offices of the makers of cars, taking them as a whole, and with the further intention of affording some accentuated detail, which may be found in the respective cars, in order that they will be more readily identified by the prospective buyers.

Beyond this point **THE AUTOMOBILE** has undertaken to illustrate very completely the methods which obtain in the plants in this country, partly with a view to disseminating knowledge of this sort, hoping, perchance, that it will bring to those who need them ideas which may be of more than a little service, and to some extent, perhaps, modify such practices as may not be quite up to the high standard on which the whole automobile situation rests at the present time. Then, in view of the large number of automobiles which are now being turned out at every hand, the supporters of the industry are entitled to know how it is that so many cars can be built without depreciating their value.

Every autoist who has sense enough to accumulate enough money to enable him to sport an automobile probably knows that he needs but one; he is but little interested in the question of the quantity which any given company may succeed in turning out in a twelvemonth. What the autoist really wants to know is that the particular car that he proposes to invest in will be good enough for his purpose, and low enough in first cost to be on a par with the legal tender which he must part company with when he rolls the car away and starts it on the road to history.

The illustrations of shop methods and practices as offered in these pages are the real means by which automobiles are made in a large way, they having been photographed in many plants under the eye of the Editor, taking some 15 weeks in the process, so that



Steering mechanism and front axle of Pierce-Arrow motor cars complete and isolated from all other correlating parts, so as to show the operating clearly. The steering gear carries a large hand wheel, and the gear operates at the lower end a drop-forged lever, which moves the connecting link back and forth. This link is attached to the right hand pivot or knuckle, on the under and inner side, the motion moving that knuckle about the pivot point.

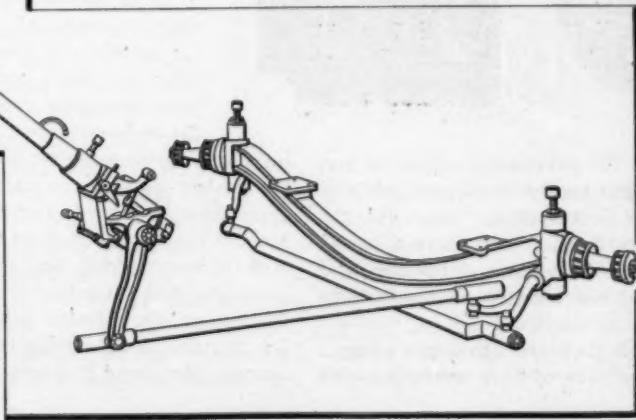
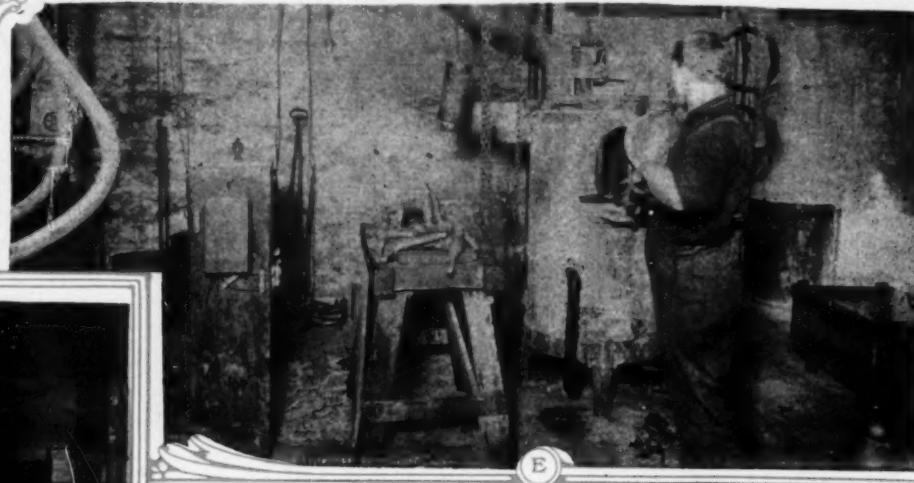


PLATE I.

STOCK
AND
SELECTION

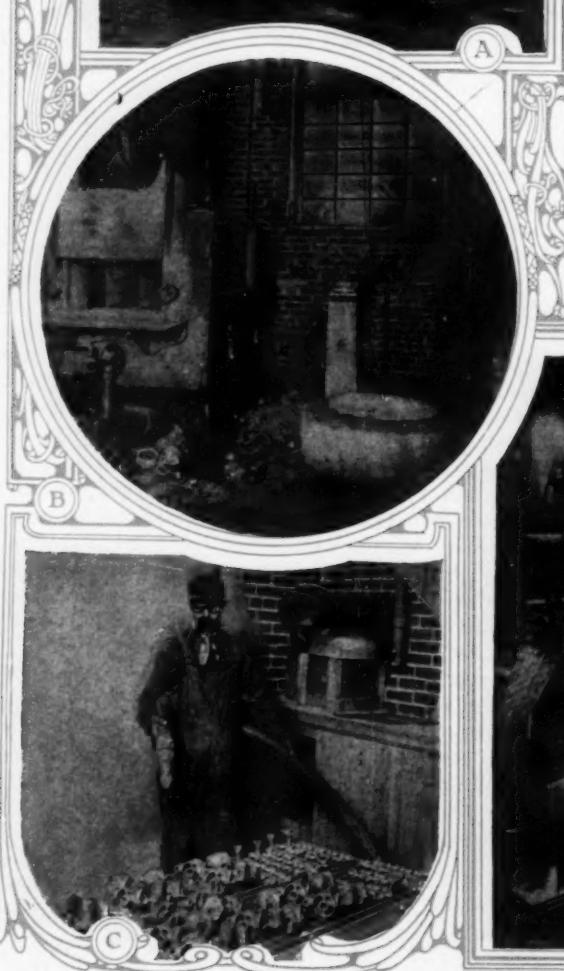
A—In the Thomas plant, showing drop-forged gear blanks in the foreground and annealing furnaces which are utilized for the purpose of relieving internal strains in order that the gears, after they are sized, gashed and planed, may be cemented, quenched and tempered with freedom from deformation. This cut shows the light, clean place which the modern workman has to work in, as compared with the dark, dingy holes common in earlier days. This is one of the results of a more accurate knowledge of the benefits accruing from hardening, and a more intimate technical knowledge of the processes themselves. They are now very generally practiced, nearly every shop having its hardening room.

B—In the Inter-State plant, showing a muffle-furnace to the right, with a counter-poised door, a quenching bath to the left, in front, and a pyrometer on a stand under the window.

C—Sand blast in the works of Wheeler & Schebler, blasting a batch of carburetor castings, which process removes scale and permits of machining at high speed under conditions which prolong the work between grindings of the cutters. If the carburetor bowls are not to be polished and lacquered a sand blast finish is allowed to remain.

D—In the Diamond Chain plant, showing how women are employed in the process, this particular illustration being that of a cutting-off tool which parts the specially formed bar, into 28 separate blocks, in three minutes.

E—In the Woods plant, using a barium salt bath for heating parts as steering knuckles to a quenching temperature, utilizing a pyrometer, by means of which the temperature is definitely determined and the quenching temperature is fixed in view of the known quality of the material which is to be manipulated.



they are offered with a measure of confidence which is not dimmed by the fear that the dream of some ambitious publicity agent is taking expression. The illustrations, then, and the brief descriptions which accompany them, should serve a useful purpose in connection with the car descriptions attending, and the only source of regret lies in the absence of illustrations from every plant in the country.

In many of the plants, although they are fitted out after a fashion thoroughly up to date, they were so busy struggling with

the output of the year that it was considered inexpedient to permit of photographing the processes, and the probabilities are that a further effort along this line will be undertaken a little later on, when the season's product is more nearly completed. For the present, then, and in view of the opportunities for comparison which the National Show at Chicago offers, the cars there to be exhibited are given brief space (each one of them) in this article, with an illustration of some one mechanical point, and for the rest, the shops behind the cars are exposed in analytical form, by means of reproductions front photographs in 10 double-page plates, with descriptive captions attending.

ALCO RETAINS PROMINENT BERLIET FEATURES

These well-known cars, which are the product of the American Locomotive Company, Providence, R. I., are listed in four regular models, the smallest of which is a 16 horsepower with a landauet type of body which is obviously a good size for taxicab and town car service. In certain classes of service of the character as above indicated, preference is given to a somewhat more powerful motor in certain localities and the 22-horsepower model is then employed. In touring work, the 40-horsepower model is the most used car, although the 60 has its stout appearance among the "hurry" clan. The three first-mentioned models are four-cylinder, but the 60 is a six. The car which won the Vanderbilt Cup Race last fall, it will be remembered, was also a six. In fact, it was an exact duplicate of the standard and stock car, which any Tom, Dick or Harry can buy, if he but has the price. This, like all Alco motors, has a rather long stroke, that is, it is not excessively long, but on the other hand it is not short as compared with the bore.



F—In the Woods plant, showing a salt furnace which is long enough to take an I-section and raise it to the appropriate treating temperature, uniformly and with great precision, it being the case that the temperature of the bath is regulated by a pyrometer in conjunction with suitable rheostats, and the proportions of the salts are also suitable, in view of the desired temperature.

G—In the Diamond Chain plant, showing a woman operator hand-grinding links with such dexterity as to do the work in the minimum possible time, attaining a light surface finish of the hardened, close-grained alloy steel. Women are very widely utilized as employees in this modern chain manufacturing plant.

H—In the Woods plant, showing an open hearth with a salt bath, electrical means of heating, and pyrometer regulation. The operator hardening, short operating levers, while on the work bench at the right may be seen a lot of finished universal joint parts, showing at a glance the wide scope of usefulness of the hardening furnace.

I—In the Diamond Chain plant, giving a glimpse of a battery of muffle-furnaces, of which there are two rows facing, extending for the length of the heat-treating department.

J—In the Thomas plant, showing an operator with an electric buffing equipment, polishing the surfaces of cylinders used on Model M Thomas.

K—In the Rambler plant, making forgings under a press. This large and heavy hammer is seen turning out crankshafts in the rough, the operation being the very last one of the process. In this Wisconsin plant, hammers of the vertical type are extensively used, not alone for large, heavy work, but for smaller and lighter drop forgings.

Alco motors are made with a lengthened stroke as compared with bore, as the following will show:

RELATIONS OF CYLINDER DIMENSIONS

Horsepower	Bore	Stroke
16	100	120
22	100	120
40	120	150
60	120	150

The difference in power between the 16 and the 22 is a matter of speed, the bore and stroke being the same in both cases. The difference in power between the 40 and 60 is due to the increase between four and six cylinders.

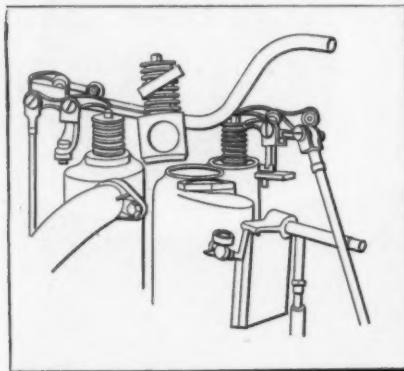
ANHUT SOLD BY CAR MAKERS SELLING COMPANY

Made in Detroit, and distributed by the Car Makers Selling Company, Chicago, the Anhut "six" is one of the relatively new automobiles which has rapidly forged to the front. The motor is a "Brownell" and was very completely illustrated in *THE AUTOMOBILE* in the number of December 16, last, with cross-sections showing, among other points, details of design which are at quite some variance from general practice, as a supplementary cam-roller lever which eliminates lost motion and noise from the valve lifts and promotes long life by preventing wear. The oiling system, in this type of motor, is very completely carried out, and the valves, which are in the head, are actuated by a system which is so closely fitted as to run noiselessly, with a special means of lubrication to abort the growth of noise, which is but a matter of defeating wear. The cylinders are cast in pairs, valves are in cages, and the crankshaft, which is of special steel, forged, and reduced from a billet, is flanged for the flywheel and is of excellent proportions. Ignition is by magneto, placed back



of the carburetor on the left side of the motor, and the clutch is of the multiple disc type, within the same housing as the transmission gear, which housing is integral with the crankbox. The flywheel is in front and the unit power plant, which is its right designation, is suspended on three points; the rear suspension is centrally located and flexible. The price of the roadster model is \$1,750 and the pony tonneau sells at \$1,850. Although a comparative newcomer, the excellent impression produced at the start has had its effect, and factory additions are rumored.

THE N.Y.A.A.M. SHOW



One of the distinctive features of the Pennsylvania engines made by the Pennsylvania Auto-Motor Company, Bryn Mawr, Pa., is the use of overhead valves located in a different sort of a cage. This—the illustration not only illustrates it, but also shows one valve and cage removed—is an arrangement which allows of the rapid and ready removal of any or all of the valves and cages for the purpose of grinding in. When removed, the valve may be placed in a vise and ground in.

APPERSON JACK RABBIT ON SPEAKING TERMS WITH FAME

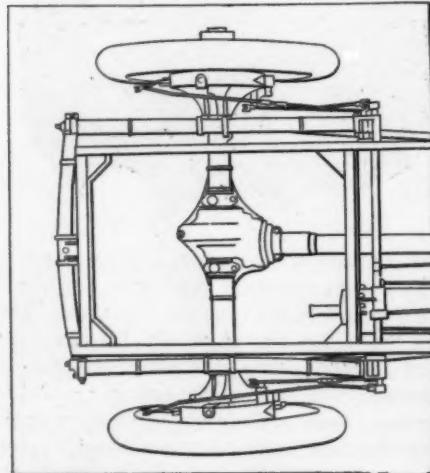
The Apperson cars are made in six models, with a price tag ranging between \$2,000 and \$4,200. The motors are all of the long-stroke type, and the model 6-40 has six cylinders with a bore of 4 1-2 and a stroke of 5 inches. The cylinders are individual, Bosch ignition is represented by a magneto for the running condition and a storage battery, in conjunction with a suitable coil, serves for cranking and should an emergency arise. In the Apperson cars the clutch is of the constricting band type, and speed changes are, with the transmission system, of the selective order, three speeds ahead for all but the 4-50. The Apperson idea from the economy point of view is to equip all of the models with relatively large tires, which is illustrated when it is said that the model 4-30 weighs 2,700 pounds and has 34 by 4-inch tires on the rear wheels.

BLACK CROW IS WELL KNOWN IN THE CENTRAL WEST

This car is priced at \$1,200, has a 24-horsepower motor, is built for touring, seats five, is of the six-cylinder type, with 3 7-8 by 4 1-2 bore and stroke of cylinders, respectively. A Remy magneto is responsible for ignition, but a battery and coil occupy the supernumerary position, and the transmission is by the selective system with three speeds and a reverse. Ball bearings are employed at every point excepting in the motor, and the tires used are 32 by 3, front and rear.

CARTERCAR IS A FRICTION DRIVE AND WELL KNOWN

Model H Cartercar sells for \$1,100 with a 25-horsepower, four-cylinder motor and a runabout body. The cylinders are 4 inches square, and the A. L. A. M. rating is 25.6 horsepower. The water cooling is through a tubular radiator, and ignition is cared for by a Splitdorf magneto in conjunction with dry cells and a



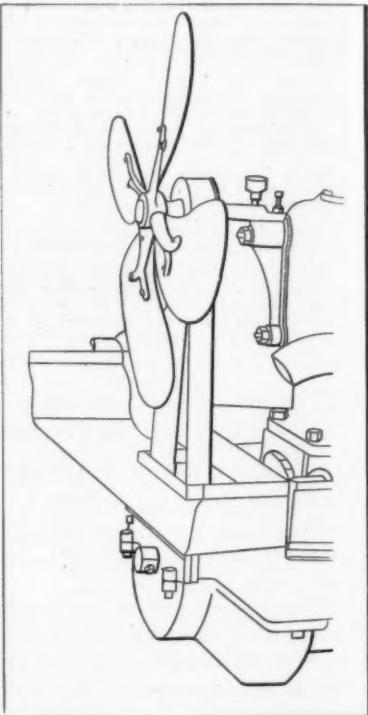
This year, Mitchell produces a "Six" for the first time. The cut shows a top view of the rear portion of the chassis of Model S, as the six-cylinder chassis is called. In this may be seen the arrangement and attachment of the rear spring suspension. As will be seen this consists of a platform spring, the center of the cross spring being firmly fixed to a bracket extension at the rear end of the frame. The side springs are clipped to the axles at the mid-point, and shackled at the front to the spring hanger, and at the rear. The net result is very easy and pleasurable riding.

coil. Lubrication is by a pump which is positive, and the friction drive gives an infinite number of speeds. In connection with the friction system a chain is used, and it is protected by a boot so that the silt of the road has nothing to do with the performance. The road wheels are fitted with 32 by 3 1/2-inch tires all around, and the car weighs 2,000 pounds. The Model L car of the same make has a somewhat larger motor, and sells for \$1,600, otherwise it conforms to the well-known Carter type of construction, the advantages of which are adequately proclaimed by many users.

CHALMERS-DETROIT THIRTY HAS BLOCK CYLINDERS

The crankshaft of this motor is short and stubby, which is possible, in view of the block method of casting the cylinders, and two annular-type ball bearings of a proven size are used to support the crankshaft effort. When this type of construction first came across it was questioned by some of the advocates of more bearings for a crankshaft, but the large number of cars

Fan driving methods are various, but in clean lines and direct attack of the main problem, no one of the solutions excels that of Paul Gaeth, designer of the Gaeth cars. As the appended illustration shows, the forward extension of the crankcase has a slot through which a wide-faced, flat leather belt passes, connecting the driving pulley on the crankshaft extension and the fan above with a continuous source of power. The case is not left open, but the lower part, below the driving pulley, is closed in completely so that no road dust or dirt may penetrate through openings there to the more delicate crankshaft parts within. The fan itself has four blades of approved shape, and is carried on a shaft extended from the front cylinder, and bolted to a projection thereon. The bolting up arrangement is such as to allow a rather extensive adjustment motion, so that no matter how much the belt may stretch, the adjustment is sufficient to care for it and maintain the necessary tightness. Other features of this car may not be seen in this view, but the thermo-siphon cooling system is very well worked out, the water pipes being unusually large in diameter.



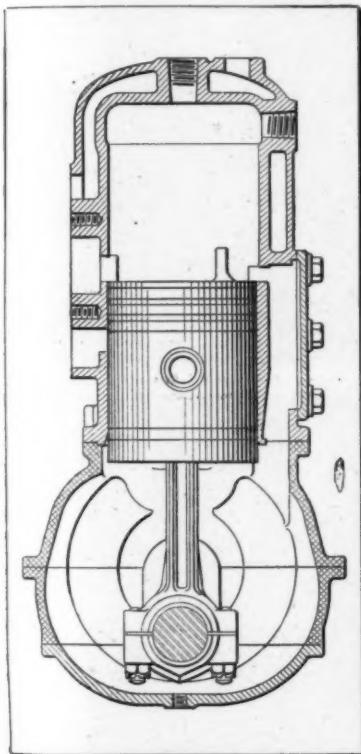
which were put out in this way, in view of the excellent service by them rendered, rendered speculation unprofitable. This year the 30 is a considerably larger car than last, the bore of the cylinders being 4 inches and the stroke 4 1-2, is rated at 30 horsepower, and the car sells for \$1,500. Ignition is by Bosch magneto at the extra cost, which means that the coil and battery ignition, as normally put on, is on a very substantial basis. The three-speed selective gear is in a case which is an extension of the motor case, thus bringing the power plant, multiple disk clutch and transmission gear into a single housing in conformity with the demands of a unit system. The wheelbase this year is 115 inches; tread standard; spring suspension is as before, which includes three-quarter elliptic springs of the scroll type, and ball or roller bearings are used at every point. The tires are 34 by 3 1-2 inches on all wheels, and the road performance, despite the excellent qualities of the car is on a distinctly improved basis.

CORBIN MODEL XVIII SELLS FOR \$2,750

The motor in this car has four cylinders, works four-cycle, the bore is 4 1-2 inches and the stroke is 4 1-4 inches. The cylinders

THE N.Y.A.A.M. SHOW

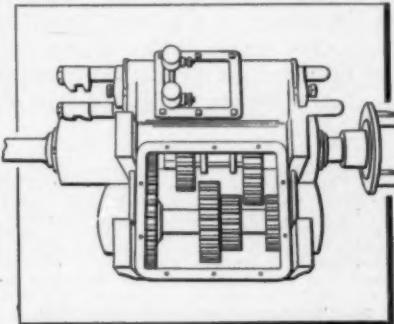
are cast individually, and a gear pump circulates the water from the jackets through a honeycomb type of radiator, it being designed for the right capacity and so made as to operate noiselessly. The Bosch ignition system is supplemented by a dry battery, and lubrication is positive through the good office of a pump. The cone clutch is of the latest and most approved design, serves in conjunction with a selective three-speed gear, and the shaft drive to a live rear axle is substantially straight lined. The chassis frame is strong, designed to work without perceptible deflection, notwithstanding the 120-inch wheelbase, which indicates a somewhat lengthened span. Ball bearings are used in the transmission and axle, and hand-hole plates are large and quick detachable, thus giving access to the crankcase, transmission gears, etc., so that on the road, should it be necessary to make a quick inspection, it is the easiest thing in the world to do. The schedule weight of this car is 2,780 pounds, and the load is carried by 34 by 4-inch tires front and rear.



DEMOT CAR AS IT IS BRIEFLY DESCRIBED

Taking the most recent information to be had directly from the maker, through the Demot Car Sales Company, Detroit, Mich., the car, which is one of the newcomers of the year, is composed as follows: Roadster body on a chassis frame, of the channel section, has a seat for two, placed a little towards the rear axle rather than in the mid-position. The power plant has a motor which is rated at 10 1-2 horsepower, and is of the double cylinder type, with bore and stroke of 3 5-8 by 3 1-2 in. respectively. The motor is of the 4-cycle, water-cooled type and a vertical tube radiator is used in the cooling process. Ignition is by Remy magneto, with an auxiliary system comprising a coil and dry cells of battery for the electrical energy. Lubrication is by splash, and a disc clutch connects the motor with the driven members. From the clutch to the road wheels is through a planetary gear system which gives two speeds ahead and reverse. The propeller shaft which connects the planetary gear with the live rear axle is provided with two universal joints, and the gear ratio is that which seems to best serve in view of the use of 30-in. diameter of pneumatics; they are 2 1-2 in. section—same in

On the newest Apperson, the drive is by shaft, instead of chains, which are much affected by this company, and, in fact, are still used on a number of models. In the cut the transmission of one of the shaft-driven models is shown. Except on one model, three speeds are furnished. The gears are of wide face, and slide on large sized and stiff shafts of high-grade material. At the right can be seen the universal joint, while at the left is just a glimpse of the square driving shaft.



front as rear. The car is said to weigh 800 pounds and anti-friction bearings are generously used; this includes annular ball bearings for the crankshaft. New-Departure bearings in the transmission, and plain bearings in the journals of secondary importance, although worthy of brief mention. This size is ample in view of the work to be done, particularly when it is considered that the car is not essentially for racing work.

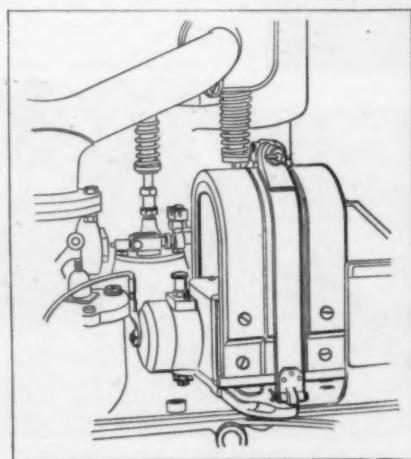
DETAMBLE CARS AS EXHIBITED AT DETROIT

This make of automobile is represented by two models, one of which is a roadster known as the DeTamble "2" and sells for \$650; the other is the DeTamble "4," selling at \$1,400. These cars are marketed by the Car Makers Selling Company, Chicago, and will be briefly described as follows: The Model "2" is fitted with a 16-horsepower motor, 30 by 3-inch Hartford pneumatics, has a 90-inch wheelbase, high-tension magneto, and a rumble seat.

The Model "4" is a large touring automobile, in which the power plant is of the 4-cylinder, water-cooled type, with 4 1-2 by 4 1-2-in. bore and stroke, high-tension magneto ignition, and the usual refinements. The wheelbase is 115 inches, standard tread, and 34 by 3 1-2-in. Firestone tires are used on all four wheels. The body is commodious, seats five, and the upholstery is in keeping with the "straight" style body, with No. 1 m. b. leather throughout. The equipment is complete, including an acetylene generator, headlights, etc.

DETROIT-DEARBORN IS AMONG THE DEBUTANTES

Model "Minerva" sells at \$1,650, with a motor which is rated at (A. L. A. M.) 35 horsepower. The body is of the new torpedo type and seats five. The motor has 4 cylinders, T-head, in pairs, with a bore of 4 1-8 in. and a stroke of 4 3-8 in. Cooling is by thermo-syphon, with a vertical round tube radiator. Ignition is by magneto, and auxiliary ignition is from a battery (dry or storage) through a coil. Lubrication is positive, two feeds to each compartment in the motor, and the clutch is a shoe type.



While any discussion of the subject of low versus high tension ignition would be foreign to these columns, it will serve the purpose well to call the attention to small, but well worked out ignition details, whether pertaining to the one or the other. Thus the cut shows the low tension magneto of the Locomobile, and the method of fastening it in place. This is by means of a flexible strap passing over the top of the magneto and jointed at the top. As it is hinged at the bottom of the side, opening the joint at the top allows of throwing the whole thing off to the two opposite sides.

internal expanding. The transmission gear is of the sliding type, selective, three speeds ahead and reverse, located under the toe-board, just back of the clutch. The wheelbase is 112 in., tread is 56 in., and the side bars of the frame are of the channel section with a double drop. The live rear axle is of the type using ball bearings, is stout but not heavy, and in the transmission system Timken roller bearings take the load. The weight of the car is said to be 2,200 pounds, and the tires used are 36 by 3 1-2 in. pneumatics on front as well as on rear wheels, that is, the same all around.

A—Shows a row of core boxes and the cores for Rambler individual cylinders, one of which is being placed by a molder. Cylinder casting is an art all by itself, and the work has developed to such an extent that molders taking up this work specialize in it to the exclusion of all other forms of molding. Frequently cylinders are molded on end, but in this particular case they are molded on the side and poured end up.

B—Finished crankshaft of a Simplex automobile which was made from a slab of chrome nickel steel and thereafter fashioned by machining processes, the final finish being by grinding on a special tool devised for the purpose.

C—In the Rambler plant, presenting a row of aluminum housings, showing steel tubes passing out from the housing extensions, which is the way the product looks after it comes from the foundry, as shown in C.

D—Heat treating furnaces as used in the Jackson plant, showing a pyrometer on a wooden stand between the two furnaces. This class of equipment is available for the many purposes which, in conjunction with a forge, permits the accentuation of kinetic qualities in materials as used in Jackson automobiles.

E—Is a view of the Rambler foundry, showing the teeming of aluminum into the mould in the process of casting the aluminum housing for the gears and the steel tube into place, one of which in the finished state is presented in the background.

F—A bulldozer used for cold pressing cross bars and other work in connection with chassis frames, showing in this particular case how tubing is bent in dies.

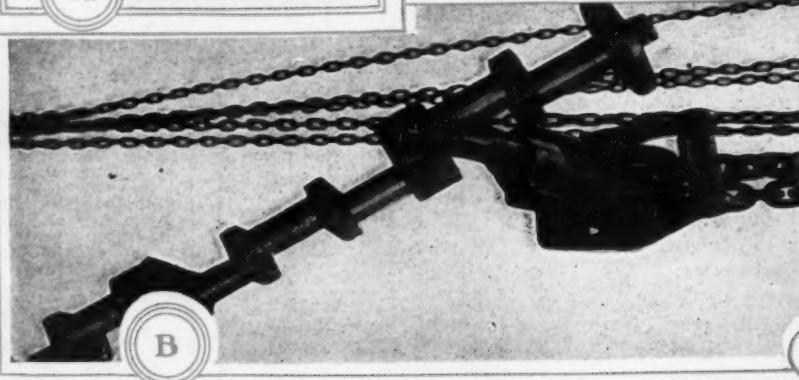
PLATE II.
IN THE FORGE AND FOUNDRY



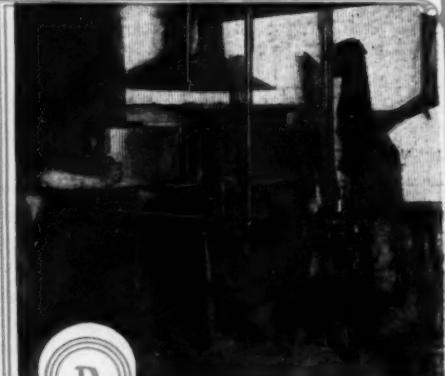
A



C



B



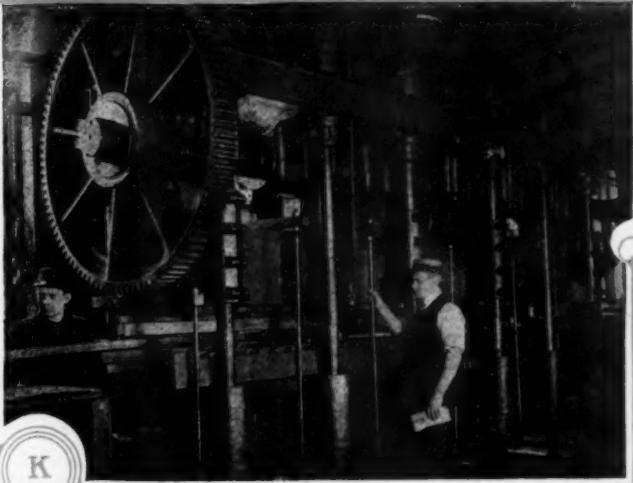
D



E



F



K



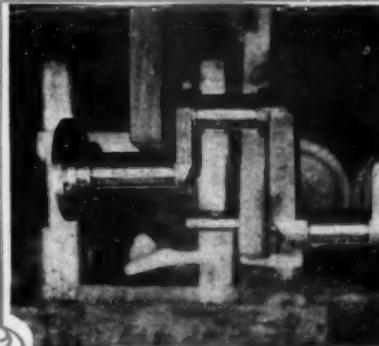
L



I



J



H



G

DORRIS "E" IS THE EXPRESSION OF 1910 IDEA

This car which is known as Model E, has a motor with valves in the head, which has long been a Dorris idea, and the Atwater-Kent ignition system is employed with a view to economical and efficient work. The company also equips with a Bosch dual ignition system as an extra. The exhaust manifold and piping in Dorris motors are so nicely designed that excess intake depression, as well as exhaust back pressure, are done away with, thus increasing the power and

G—Large press in the Diamond chain plant blanking out links for sprocket chains as used on trucks, which branch of the chain making business has increased wonderfully of late, due to the renewed and greatly increased interest now manifested in the power vehicles. Nearly every manufacturer in the land is doing something in this line, and Diamond is representative of advanced practice.

H—Finished crankshaft for an Excelsior motor which originated in a drop forging, using special steel and modern methods.

I—In the National plant, presenting a quantity of aluminum castings as they come from the foundry of the character as used in the lower half of National automobiles.

J—Is a core which is used in moulding the upper half of a Rambler crankcase. The molder is slicking up the core preparatory to the baking operation, which is done in a special oven called a core oven. In this the core is baked as hard as a board, in which condition it is ready to go into the mold. Nowadays core making is as much of an art as is the molding itself and requires fully as much skill, else the whole result will be a larger percentage of wasters, the bane of every good foundry.

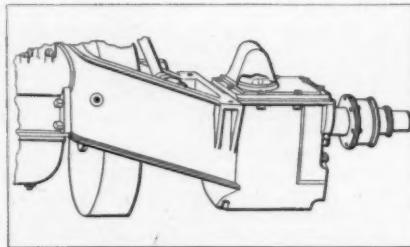
K—One hundred ton press making side bars in the A. O. Smith plant. The use of pressed steel has advanced apace in the past five years, until now it is used for nearly every piece of the automobile, even for crankshafts and crankcases. To make this possible it was necessary for some far-sighted manufacturer to install an unusual press equipment just like the one here illustrated.

L—How bar stock is stored in the plant of the Diamond Chain, each section being for a particular grade of steel and suitably marked for the purpose of identification.

THE N. A. A. M. SHOW.

flexibility of the motor. A Stromberg carburetor operates in its customary efficient way, and has been found by the Dorris Company to co-operate with the motor, delivering a certain uniformity of mixture, which lends facility to the speed

Unit construction has advanced much in the past few years, and the cut shows a sample—and a good one, too—of the unit form of power plant, as used on Moline cars. This has the advantage of reducing the whole chassis to a very small number of parts, the engine and transmission being removable as a whole.

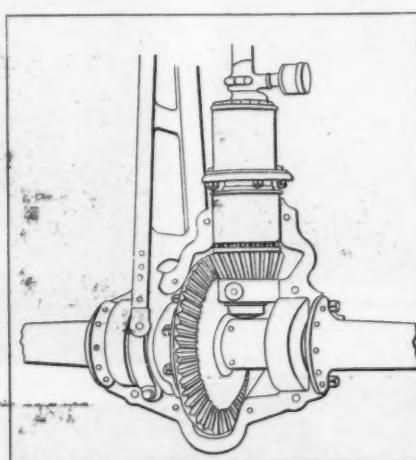


changing process, thus, in some measure, accounting for the flexibility for which the Dorris car is noted. The propeller shaft on the Dorris has a universal slip-joint construction, which will be well worth examining. Nickel steel, in the machinery equipment, makes it possible to design for desired lightness.

THE ELMORE HAS NO VALVES AT ALL

There are two Elmore models, one of which is known as the 36 and the other as the 46. The first sells for \$1,750 and the latter for \$2,500. Both are touring cars, seat five, have four-cylinder motors, the bore and stroke being the same in both cases, *i. e.*, 4 1/2 by 4 inches. To some further extent the two models are on a common basis, but a change may be noted when the wheelbase is considered, it being 110 inches in Model 36 and 10 inches longer in Model 46. The weight of the Model 36 is 2,400 pounds, and the remaining model weighs 400 pounds more. On the lighter model the tires are 34 by 4 inches all around, but to carry the heavier weight of the big car the tires are 36 by 4 inches all around. The scheme of the motor is shown by illustration elsewhere, in which it will be observed that there are three ports which are uncovered in the right succession, thus eliminating the noise and uncertainty of an automatic crankcase valve,

In the construction of the rear axle, proper provision must be made for the thrust of the bevel gears, and the torque reaction of the motor. In the Royal tourist car, both of these are adequately cared for. Ball thrust bearings take the thrust from both levels, back of which are located the radial bearings. To take the torque of the engine, a triangular form has been used, the material being pressed steel, and the shape, that of a channel, with the open side to the right. This channel shape continues throughout the entire length although tapering down to a small vertical height.

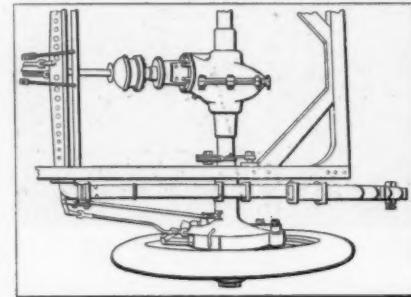


which, according to the Elmore staff, is likely to be noisy and may get out of order. In all other respects the Elmore motor furnishes all the earmarks of excellence in mechanical design and construction, while the materials employed are said to be selected with care in view of the work which experience has identified.

FAL CAR, A NEW ONE, IS MADE IN CHICAGO

Sells at \$1,650, has an A. L. A. M. rating of 28.9 horsepower, is built for touring; the motor is 4 1/4 x 4 1/4 inches bore and stroke, cylinders are cast in pairs, and a tubular radiator serves

for cooling. Ignition is by magneto and battery, with positive lubrication through the good office of a pump, and a cone clutch in connection with a three-speed selective transmission gear, is responsible for speed changes beyond the range of flexibility

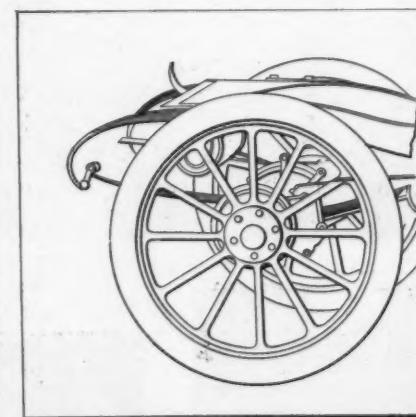


Knox Model R chassis, at the rear end as it appears from above. The equality in the pull at the two brakes is produced by the use of the flat equalizing bars shown here. These are very long, and extend through the side members of the frame, which act as guides for the bars. At the rear end, the frame is strengthened by the diagonal inset piece, this being of the same shape as the frame.

of the motor. The wheelbase is 110 inches, and the weight of the car is given as 1,900 pounds so that the 34 x 3 1/2-inch pneumatics are equal to every need. A detail of the torsion tube is given as the illustration accompanying this statement, and attention is called to the excellence of detail of the live rear axle, brakes, and methods of control, in which it is true that the brake system is inside of the line of the springs, and the part of the axle which carries the perch on each side, has arms extended, spider fashion, with bearings integral therewith to support the brake arms, and lend facility to the process.

FORD PROMINENT AMONG IMPORTANT CARS

Among the makers of touring cars no one is better known than Henry Ford, while the same might be said of his product. This little car, differing now in very few details as originally brought out in 1906, is a four-cylinder, water-cooled, four-cycle machine with bore of 3 3/4 inches and 4-inch stroke. The maker's rating is but 20 horsepower, while the usual formula would allow a rating of 22.5. Although formerly strictly a runabout, pressure from the buying public has forced the use of a touring body accommodating four. The wheelbase of 100 inches is ample, the tread is standard, engine cooling is by thermo-siphon, lubrication



Among the newcomers, Hudson cars show many little points which savor of old experienced factory heads. Thus, the rear construction of the Hudson "Twenty" shows a decided upsweep in the frame, three-quarter, scroll ended, elliptic springs, a muffler set across the frame to look like a pressure gasoline tank, such as is used on cars of ten times the price. For the size, power, and weight of this runabout, the wheels and tires are of large, not to say ample, diameter. Rear wheels have twelve spokes.

is by splash, and other details are up to the standard of excellence of the big new Highland Park factory, just occupied. Any mention of this car would be incomplete without a terse statement of the use of vanadium steel, the anti-fatigue metal, which is used liberally throughout the chassis.

AIR-COOLING NOW AS EVER FRANKLIN'S STANDARD

With a consistency rare these days, the makers of the Franklin automobiles hold strictly to air cooling and light weight construction. Three models are made, differing in power, length of

THE N.Y.A.M. SHOW

wheelbase and body styles. These are lettered G, D and H. The first is an 18.2-horsepower car, with engine of four cylinders, 3 3/8-inch bore by 4-inch stroke. The wheelbase is 91 1/2 inches, tread is 53 1/2 inches, tires are 32 by 3 1/2 inches front

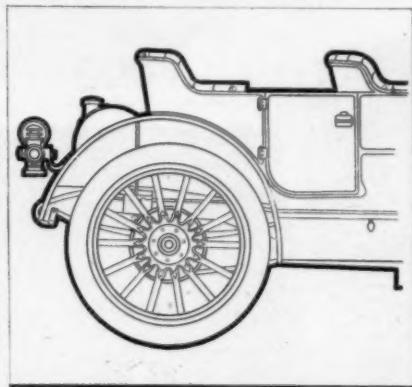
The sides of this body look low, but they are not. The low impression is conveyed by the comparison with the wheels, which comparison is deceptive for these are forty-two-inch wheels, and the car, the Oldsmobile Limited. The large diameter wheels swallow up small road inequalities much more readily than would those of smaller size, making the car as a whole ride much easier. This is one of the features of the big Oldsmobile which is being advocated widely as advanced automobile construction.

and 32 by 4 rear. In the next larger model, D, called 28.9 horsepower, with a 4 1/4-inch bore and short stroke of 4 inches, the wheelbase is increased to 106 inches with touring body and 114 1/2 inches with enclosed bodies. Tread remains the same, but larger wheels and tires are used, 36 by 4 front and 36 by 4 1/2 rear being the exact figures. Model H is the only six, and the biggest and best of the line. The engine is of 4 1/4-inch bore and 4-inch stroke, rated at 43.8 horsepower. A wheelbase of 127 inches and typical Franklin springing makes riding easy, while the large tires, 36 by 4 1/2 and 37 by 5, make maintenance expense low.

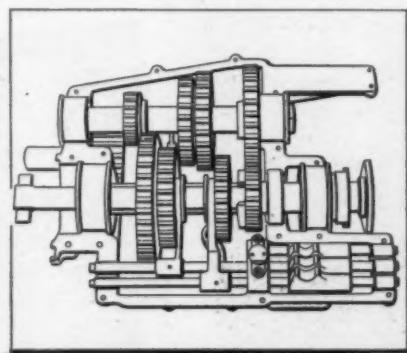
GAETH AUTOMOBILE MOTOR IS EXTREMELY SIMPLE

In this motor, as it is applied to Gaeth automobiles, the upper half of the crankcase, instead of having individual arms reaching out to the chassis frame, is so flanged that all the space between the face proper and the frame is engaged, with the result that the under pans or sod aprons, as they are sometimes called,

Black-Crow is the name of this newcomer from the West and showing a full line at the Chicago Show. The small view illustrates the rear end of the Model D roadster body. This shows two rumble seats, but also comes with but one, or without any if desired. In combination with the low, comfortable seats in the back, the very high fender adds to the comfort of the occupants by shielding them from the mud of the road. The leg room between the rear seat and the back of the front framing is ample. Just a glimpse may be had of the rear end of the large and roomy tool box.



cylinder to a sufficiently large diameter for the front cylinder to compensate for the differences in volume of water, and the distribution is, therefore, on a satisfactory basis. It is very likely that the Gaeth make-and-break system of ignition is more inter-

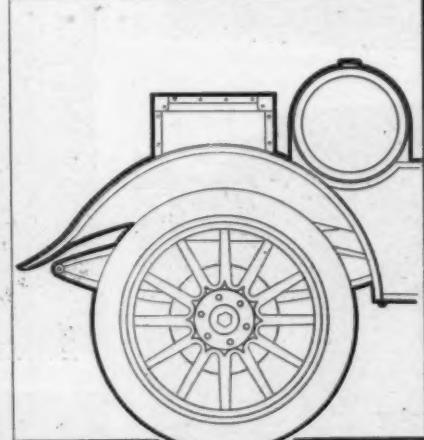
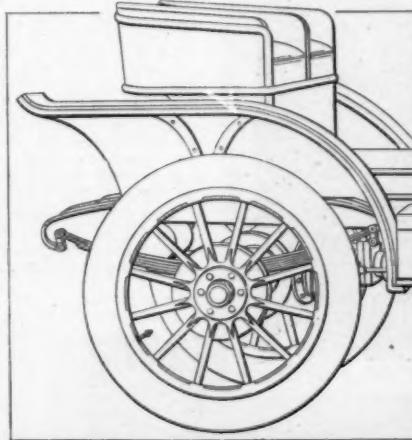


Four speeds forward and one reverse are provided in the Stearns gear box. The gears and shafts are made from chrome-nickel steel, which is the strongest and toughest material available. Annular ball bearings are used throughout. The gears are shown in the high speed position, this being effected with a series of jaws on the forward end of the one gear, which mesh with a similar series of jaws cut into the main driving gear.

esting than some of the other points which might be mentioned, but this system has been quite fully described heretofore, and space is here too limited to indicate a repetition. The motor has four cylinders with a bore of 4 7/8 inches and a stroke of 5 1/4 inches, which brings it into the long-stroke type. The A. L. A. M. rating is 38 horsepower, and with a touring body the car sells for \$3,500.

THE HUDSON "TWENTY" IS MAKING HISTORY

The price of this car is \$1,000, and the A. L. A. M. rating of the motor is 22.5 horsepower, with a four-cylinder, water-cooled motor, a bore of 3 3/4 inches and a stroke of 4 1/2 inches; cylinders cast *en bloc*. Cooling is with a tubular radiator of the McCord type, and a centrifugal pump circulates the water advantageously. Ignition is with a dry battery and coil, excepting that a magneto may be had as an extra. The wheelbase is 100 inches, with a 56-inch tread in the roadster type, but the same car when put out as touring type has a wheelbase of 110 inches. The chassis frame is pressed steel of nice design, and plain bear-

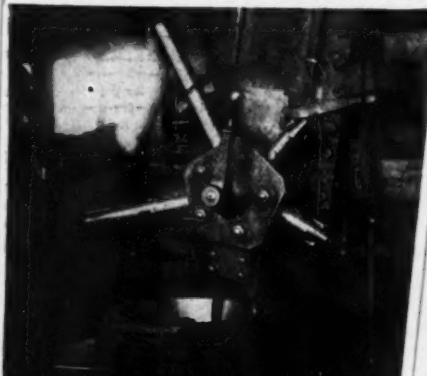


In place of the usual single rumble seat, the Oakland, Model M, forty-horsepower car has a very large gasoline tank and a big, broad trunk. The seating capacity is, of course, but two, still the added convenience given by the increased mileage per tank full of gasoline, and those due to the capacity of the trunk more than make up for this. The tank is held in place by several wide metal straps, and has a very large central and accessible filling cap. Fenders are wide and deep, to afford maximum protection, while the seats are low and comfortable. The long fenders give the impression of speed.

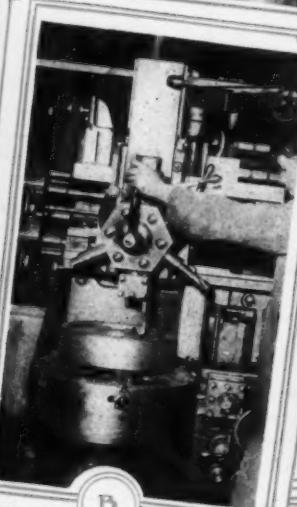
do not have to be used. The magneto is placed on the left side of the motor, and is protected by the case flanging, so that it is not only accessible and directly attached (without driving through a pump), but lost motion and other possible troubles are eliminated. The exhaust manifold is especially designed for reducing back pressure to a nominal value, and as the exhaust sweeps out of the transfer ports the shape of the manifold is such that it is swept upward and then away by easy curves, and the working space around the motor is increased by this shape as well. The water piping on top of the twin cylinders is especially well designed, and it tapers from the small diameter at the rear

ings are used in the crankshaft and other places, excepting for the axles. The cylinders are cast from a special grade of gray iron, and ample means is offered for the escape of gas in the foundry process. The crankcase is supported by four sturdy arms and the crankshaft is of a special grade of crankshaft steel in which the tensile strength is minimum at 100,000 pounds per square inch, and the elastic limit holds to a high point, due to proper heat treating, which is done under well-defined conditions. Accuracy is due to grinding as the final operation, and the methods in vogue in the shop are all with a view to producing a car which will be suitable for all around and strenuous road work.

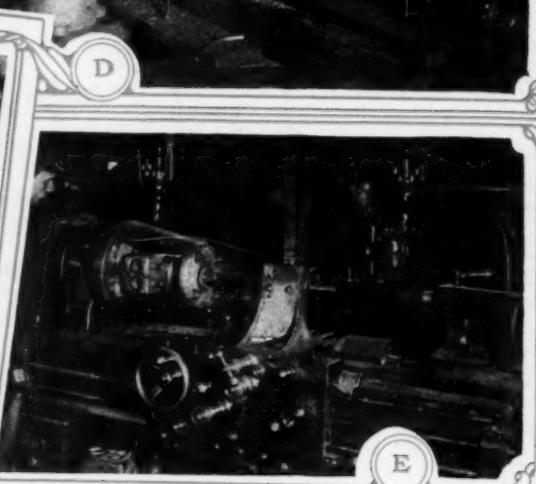
PLATE III.
RAPID LATHE
PROCESSES



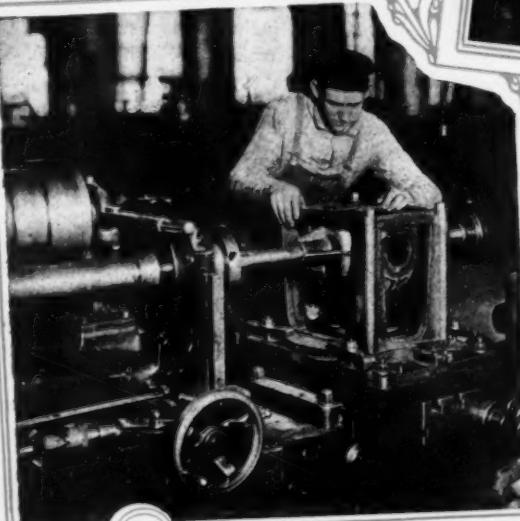
A



B



D



C



A—Represents a vertical turret boring mill finishing the cone face of a flywheel as used on National motors. This method of finishing flywheels is quick, accurate, and has the further virtue of making them interchangeable. It is something of an advantage to be able to assure purchasers that a flywheel will not have to be sent out if, for some cause, it is necessary to replace a crankshaft, and this will be a condition when the flywheel work is done on a machine which eliminates the personal equation.

B—Is a small Bullard (vertical) mill with a turret attachment, which is the latest substitute for a lathe as used in the process of machining flywheels for automobile motors. This view was taken in the Excelsior plant.

C—Represents a horizontal boring mill finishing a housing for use in a National transmission system. When special fixtures are properly made it is quite an easy matter to take the fullest advantage of lathes, it being a well recognized fact that this character of tool is very nimble, delivers good accuracy and lends facility to the process in view of the skill of the men who have to do the work.

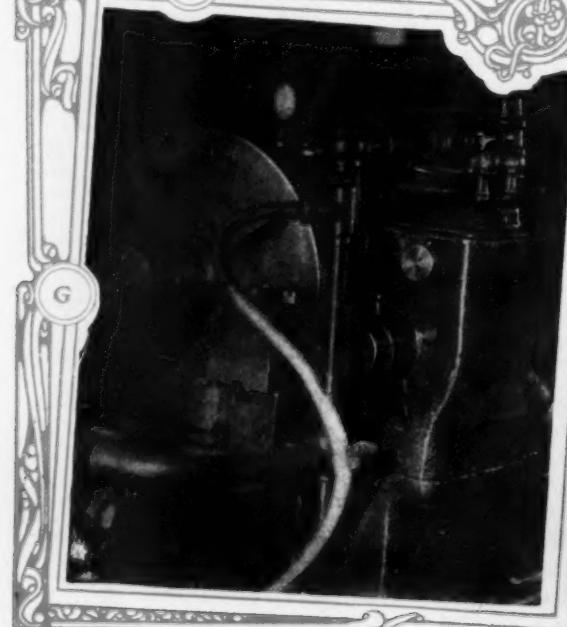
D—Represents a special cutting off tool photographed in the Rambler plant, showing the method of parting piston rings from the turned up casting after it was machined to the correct bore and outside diameter.

E—In the Rambler, showing a special fixture for holding individual T-head cylinder heads and method of rough machining in a lathe rigged up for this specific purpose.

F—A vertical mill with a turret head finishing bevel gear blanks as used in the bevel drive on Rambler automobiles. In the making of bevel gears it is something of an undertaking to do the work of blanking, then machining, and considering the use of alloy steel, accomplish the operations quickly, keeping cost low.

G—In the Moon plant, showing a turret lathe fitted with a face plate and a suitably shaped mandrel over which a piston is pressed, and the grooves for the piston rings are being finished.

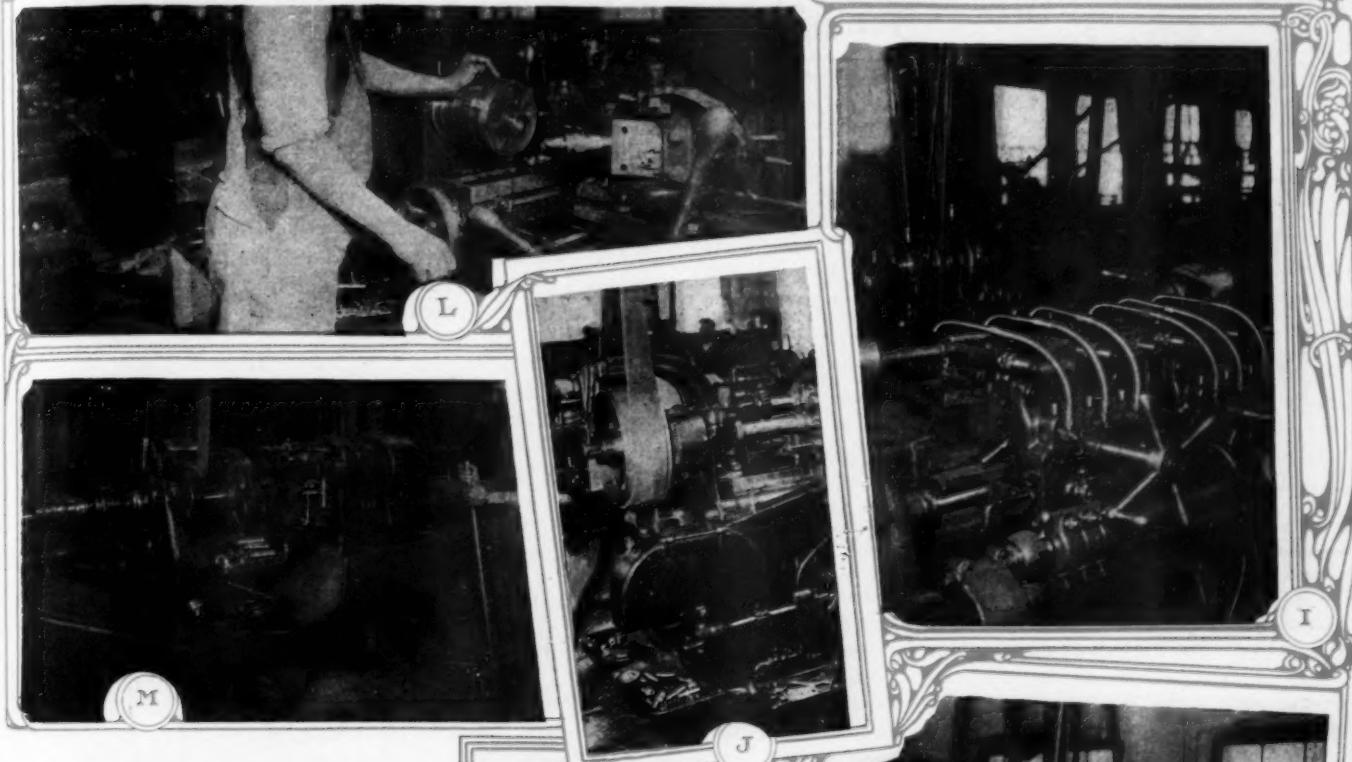
H—Making Diamond chains—a battery of automatic screw-making machines turning out alloy steel rivets.



G



H



I.—In the Excelsior plant a multiple cutter lathe finishing cam shafts with a cutter working between each pair of cams. A cutter for each round portion, working in unison with the other similar cutters, is like subtracting a man from the payroll for each additional cutter in actual use on a given tool.

J.—Acme four-spindle automatic tool, working on small concentric round parts as used on Excelsior motors in which a single workman takes care of a battery.

K.—No. 4½ Bardons & Oliver turret lathe in the Excelsior plant, on semi-automatic work, depicting the rapid and accurate production of small concentric round parts as used in Excelsior motors.

L.—Turret lathe in the Excelsior plant finishing gear blanks at high speed on a double setting. The work which is being done is a fine illustration of the value of turret lathes when they are properly fitted out with special fixtures in view of the shape and character of the parts to be machined, and it is hardly to be supposed that any other generic type of machine tool would lend better to the undertaking.

M.—Hollow spindle automatic machine tool drilling out concentric round parts and cutting off as exemplified in the Rambler plant.

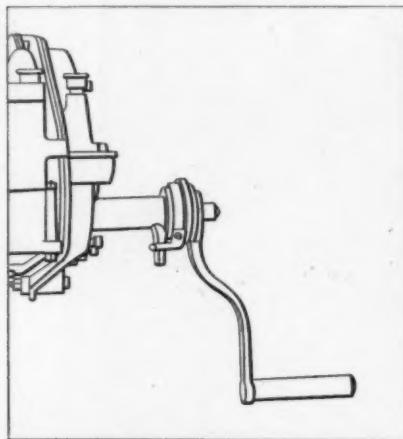
N.—In the Rambler plant, making helical springs, utilizing a small special tool which has substantially the characteristics of a lathe, the reel of wire showing in the foreground.

O.—Jones & Lamson turret lathe in the Excelsior plant, working on gear blanks.

P.—Heavy turret lathe in the Pierce-Arrow plant, machining the brake spider and sleeve as used in Pierce-Arrow live rear axles. This is a very interesting example of the use of a machine tool with a hollow spindle, in which the round bar is placed and shoved forward as the parts to be made are finished. In this way the feed is as rapid as the occasion demands, and the time which is usually taken in setting up the work is avoided. As a rule mistakes are most likely to happen during the setting up operation, and it is in this process that the most time is consumed.



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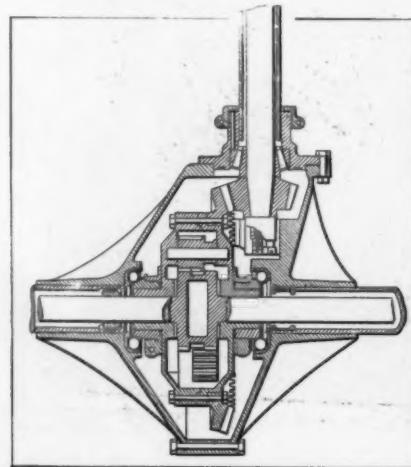
Also is showing a starting crank which prevents back kicks and troubles of this sort are eliminated beyond any doubt. The method, as shown, is so compact as not to alter the front appearance of the car, and, by a reverse motion, which is housed in, the finger which is the only part which extends out from the housing, intercepts a dog on the crank, by means of which the reverse motion is thrown into gear and the crank is thereby disengaged within about a quarter of a revolution of the crank. The device is so simple that to get out of order is quite out of the question.

MORE POWERFUL INTER-STATE LOOKS GOOD

Among the new cars, no one looms up better than does the Inter-State "Forty," which is made in three models, designated as 30, 31 and 32. These are but the methods of indicating the differing body styles, for all three rest upon the same chassis. Thirty refers to the touring car body with standard equipment, ready for five large people, and with plenty of leg room. Passing on to Model 31, it is the demi-tonneau or short coupled body as some prefer to call it. In this the rear seat is just above the rear axle, and although the capacity is reduced to four persons, the feeling of roominess is unchanged. Model 32 is the runabout, the same designation applying whether no rumble, single, or double rumble is used. The chassis is powered with a motor of four vertical cylinders, of 4 1-2-in. bore and 5-in. stroke. It is rated at 40 horsepower by the makers. All engines' parts are finished by the grinding process. The wheelbase is 118 in. and the tread standard. All wheels are made interchangeable by the use of the same sized tires all around, 34 by 4 in. In touring form the weight is given as 2,700 pounds, which is reduced 50 pounds by the use of the smaller capacity bodies. Among the parts or qualities featured by the makers are: Transmission and disc clutch in a unit; two distinct ignition systems; very efficient lubrication; unusually large steering wheel; well selected springs, making riding easy, and very complete equipment without extra charge.

THE JACKSON LINE INCLUDES THREE MODELS

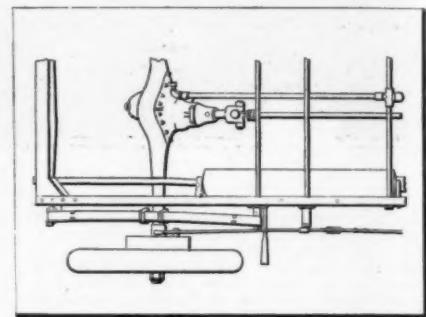
Perhaps the most conspicuous new idea in the Jackson line of cars will be found in the method of transmitting the power from the crankshaft to the superimposed camshaft on the 30 model. The next point of unusual merit, which will be found in all Jack-



Rambler live rear axles, in view of the service they render, are worthy of reproduction in section in order to help purchasers to understand how they are assembled. The differential gears and pinions are especially well made, and roll on ball bearings which are placed at the ends of the shells. The bevel gear is integral with one-half of the differential housing, and the meshing pinion is supported at the end of the torsion tube by means of a tapered roller bearing which is of the Rambler make. The same pinion is supported at its outer end by a plain bearing, which is sectioned.

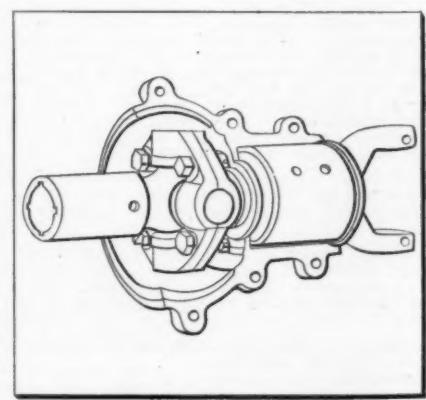
son models, lies in the method employed in housing the walking beams which actuate the valves in the head in response to the lifts as they reciprocate under control of the cams. The walking beams, and, in fact, all moving parts are housed in, accessible by means of covers, and the bearings swim in oil, which is replenished continuously in response to the demand. The valves are set at such an angle that the gas, due to combustion, has a direct passage as it whisks away to the muffler, and back pressure is reduced to a mere suspicion because of this fact, which is furthered by the proper use of a well-designed muffler. In the Jackson models, excepting the 30, a plate clutch is used, there being three discs under control of a toggle system and means of adjustment renders it a simple task to take up for such wear as there may be in time. Jackson cars are sprung on full elliptic springs fore and aft, and the springs are so designed that the mass of material is in sufficient presence, considering the energy which must be absorbed to snub the vertical bounce as it is in-

Timken roller-bearing axle as used in a considerable number of automobiles which will be at the show. This axle has a special-shaped drawn-steel shell, which houses in the differential gear, bevel drive, and shafts. The differential gear system, as well as the bevel drive, are in a separate unit which may be removed from the steel shell for inspection or repair, and in reassembling, trouble is eliminated.



duced by the speed of the car as it negotiates road inequalities. In the Jackson plant, as is generally well understood, the equipment includes everything from drop forgings to the finished article; even the springs are made in a nearby shop which owes its allegiance to the same deity.

In the Regal automobiles, while there are many points of mechanical merit to be examined closely, it is the purpose here to call attention to the universal joint at the motor end of the propeller shaft, and also to the presence of a nickel steel Hyatt roller bearing of extra proportions to take the work. This bearing is supported by a cross-bar of rigid design, and the machinery is thus relieved of any of the shock which comes from the road in contact with the wheels. This plan adds to the transmission stability.



KNOX R CHASSIS IS A MECHANICAL MASTERPIECE

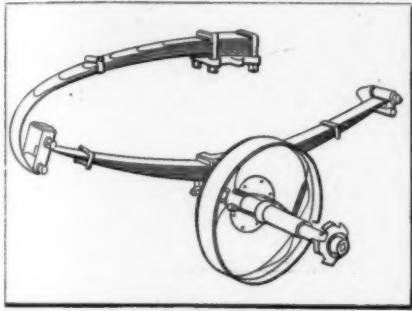
The Model R chassis has a 40-horsepower motor, and is built for touring, with a body which accommodates five comfortably. The cylinders are 5 by 4 3-4 bore and stroke, respectively, of which there are four, cast separately, with valves in the head, and a silent rocker system by means of which they are actuated through the good office of a single camshaft which resides in the crankcase below. In order to get at the valves quickly for any purpose, the head is made separable and may be unbolted by a novice with small effort. The transmission gear is in an extension of the crankcase which forms around, leaving a rectangular space in which the flywheel spins, with room enough besides for the clutch, pedals and relating parts. The cellular radiator is sufficiently large for the purpose, and proper cooling is further assured through the suitable use of a centrifugal pump. A Bosch

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high-tension magneto furnishes ignition on a high plane, but for purposes of cranking and in an emergency a coil and storage battery are employed. Lubrication is positive through the use of a pump, and the clutch, which is a three-plate system of the dry type, co-operates with the selective three-speed transmission gear and shaft drive to a live rear axle of undoubted quality, utilizing a pair of universal joints, one at either end of the propeller shaft. The wheelbase of the car is 117 inches, and standard tread, with a well-shaped special steel channel section set of side bars, reinforced at the narrowing point on which the body rests.

KRIT IS A NEW MODEL FROM AN OLD DESIGNER

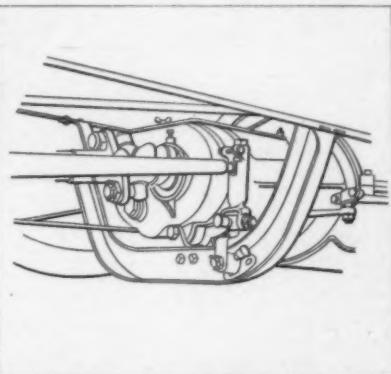
Model A of this make came out this year and is built by the Krit Motor Car Company, Detroit. The price is \$800 and the body is a runabout type seating two. The power plant comprises a 4-cylinder, 4-cycle, water-cooled motor, with cylinders 3 3/4 by 4 inches bore and stroke, respectively. The cylinders are cast



en bloc, and a tubular radiator is connected for thermo-syphon work so that the water is circulated without the use of a pump. Ignition is by a magneto, which is included in the selling price;

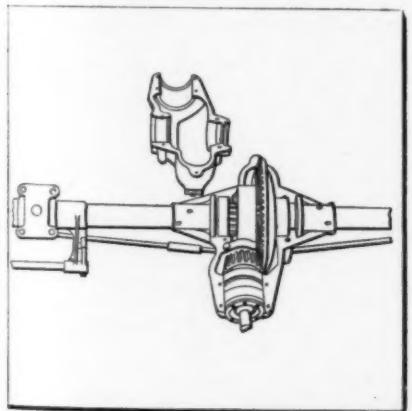
In the Chalmers-Detroit 30 there is probably no point which attracts more attention than the easy-riding qualities of the car, and in looking for the reason it is probably necessary to examine the rear spring suspension. The springs are 3 1/4 elliptic (scroll), with wide plates, and so designed that the period of the oscillations is properly regulated. The fastening at the chassis frame is well made.

Stevens-Duryea cars, in view of the unit power plant construction, are enabled to take advantage of the principle of the three-point suspension to the dregs, as it were, and as the illustration shows, the rear end of the power plant case rests at its center on a depressed crossbar of great strength. Considering the fact that this motor is a "six" and that the case must be long enough to accommodate this many cylinders, the designer has seen fit to protect the case from all outside influences.



the magneto in place, and a high degree of mechanical protection. The transmission gear is the selective four-speed system, with a cone clutch, and lubrication is by positive mechanical methods. The wheelbase is 120 inches, and the channel section frame is designed for adequate strength utilizing a fine grade of material, considering the span of supports. Ball bearings are used at all points, excepting in the motor, and the tires on the wheels are 35 by 4 inches front and 34 by 4 1/2 inches for the rear, a rather unusual combination.

In addition to this model the side-chain drive Locomobile of 40-horsepower rating is still in brisk demand, and is put out this year as one of the standard models of the company. The motor in this model is 5 by 6 bore and stroke, respectively; has four cylinders, cast in pairs, and the general construction all along the mechanical line checks up with that which obtains for the shaft-drive model, with the exception that the wheelbase is 123 inches and the tires are 36 by 4 in front and 36 by 5 in the rear, not forgetting, of course, that a side-chain drive is placed in the transmission instead of a shaft.



In the Corbin Full Jewel it is believed that the live rear axle is well worth the attention of the discriminating buyer, and for the purpose of reflecting something of what will be found in the axle this view is offered. The bevel pinion, which meshes with the gear to constitute the bevel drive, is supported most rigidly between bearings, and, in view of the torque which comes on this part, the designer made sure of his ground by spreading the bearings far enough apart to produce the desired result with certainty.

the clutch is multiple disc, and a 2-speed sliding gear system is connected between the motor and the live rear axle. The wheelbase is 96 in. with a 56-in. tread, and 32 by 3-in. tires are used on all road wheels. The weight of the car is given as 1,200 pounds, and ball bearings are placed in road wheels, excepting in the live rear axle, which has roller bearings as well. The crankshaft, however, centers on a pair of annular ball bearings. The side frames are of pressed steel.

LOCOMOBILE MODEL I IS A SHAFT DRIVE AUTOMOBILE

The A. L. A. M. rating of the motor in this model is 32.4 horsepower, and has a four-cylinder motor, 4 1/2 by 4 1/2-inch bore and stroke, with the cylinders cast in pairs. A honeycomb radiator is supported in the cooling effort by a centrifugal pump, and ignition is by low tension with a magneto; the illustration showing the simplicity of the wiring system, method of holding

MATHESON OFFERS 2 MODELS TO DISCRIMINATING BUYERS

Model M is sold at \$3,000; is rated at 48.6 horsepower; has a touring body. Model E is sold at \$5,000, is rated at 40 horsepower and is rigged out for touring. Referring to Model M, which is a six-cylinder motor, with cylinders cast in pairs, that the rating is conservative is reflected in the bore, which is 4 1/2 inches, and that the company believes in the long-stroke idea, is brought out by the fact that the stroke is 5 inches in this model. Cooling is done by a honeycomb type of radiator, with a centrifugal pump for circulation, and ignition in the main is by means of a Bosch magneto with a battery auxiliary. There are 53 discs in

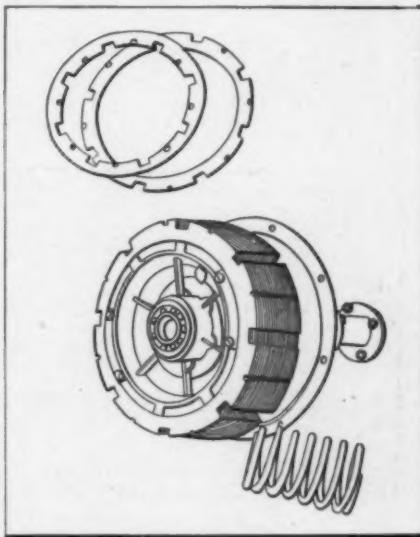
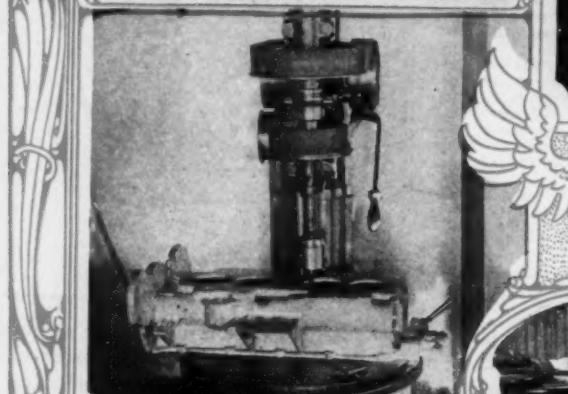
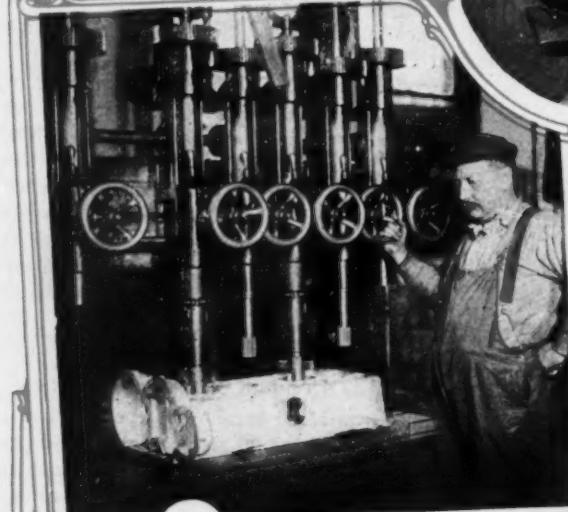


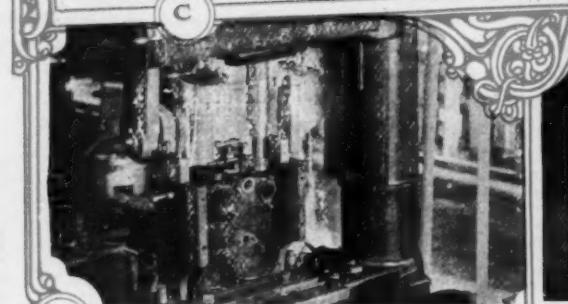
PLATE IV.

DRILLPRESS
APPLICATIONS

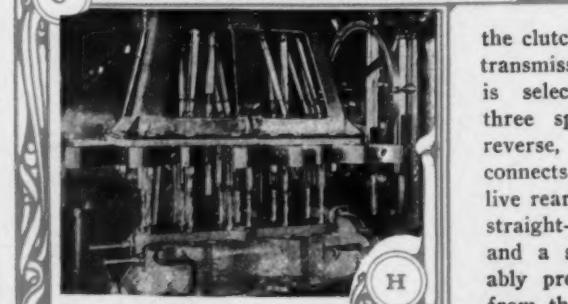
A



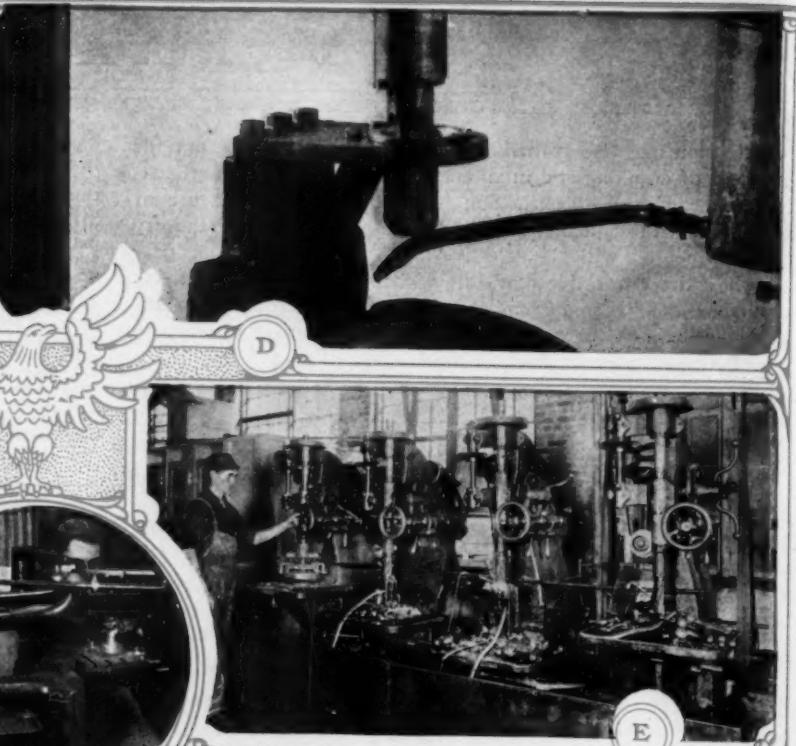
B



C



D



E

A—Drillpress used in the Moon plant for drilling holes in the aluminum crankcase after they are spotted. This is a small, sensitive drill, whose speed of output is governed only by the operator's ability to hustle. The table swings freely, so that the work is not even bolted down to it.

B—A form of sensitive drill as used in engraving name plates for hub caps on Rambler cars. This tool takes the place of a high-priced engraver. In operation the generating tool is guided by a formed plate which may be seen at the left of the picture, the operator holding the guiding point down to it with his right hand.

C—Multiple spindle drill used in the National plant for finishing crankcases, using wing cutters and reamers as illustrated.

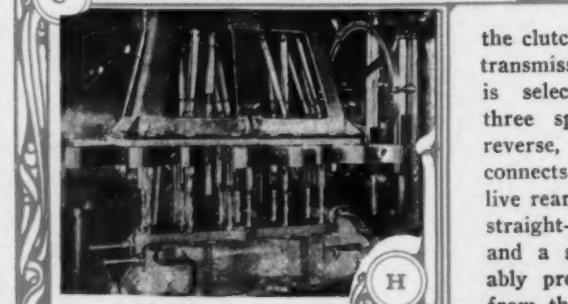
D—Drillpress used in the Marmon plant in connection with a fixture which holds the cover W in line with the tap D which in turn is guided by the hardened bushing B which is bolted through the Jig plate G.

E—Battery of drill presses as used in the Rambler plant working on yokes, levers, and other drop forgings under conditions of high speed utilizing special drills.

F—Drill press used in the Premier plant in connection with a special fixture for drilling holes in cylinders, the arrangement being such that the cylinders are automatically centered and the drill is guided through a jig hole with a hardened bushing.

G—Radial drill in the Moon plant finishing valve cover holes in cylinders of the valves in the head type.

H—Multiple spindle drill working in connection with a jig plate on the upper half of a Premier cylinder, drilling twelve holes at one time with the accuracy which is inherent in the jig, and with speed due to the use of high speed drills kept in excellent condition.



the clutch, and the transmission gear is selective with three speeds and reverse, which connects to the live rear axle by a straight-line drive and a shaft suitably provided for from the point of view of flexibility.

special steel of adequate section, showing the earmarks of the designer. The crankshaft rolls on plain bearings, but all other bearings are of the ball type, large for the work and suitably installed. The road wheels have 36 by 4-inch tires all around, which, for the weight of this particular model, are very liberal indeed. A sketch of the multiple disc clutch is given elsewhere in this article, and will prove of more than a little interest to those who follow up the details in design as they relate to automobiles, because the discs are of large diameter, but the distance which the oil has to travel to get away is but slight.

M'INTRE ADDS AN AUTOMOBILE WITH PNEUMATICS

In addition to the line of high-wheeled cars built by the W. H. McIntyre Company for several years past, this season

The wheelbase of this model is 125 1-2 inches, with a 56 1-2-inch tread. The channel section frames are of



I—A special multiple spindle drill used in the Moon plant in cylinder work involving a special fixture. The particular feature of the tool lies in its ability to drill under conditions of close centers as illustrated. This is brought about by gearing the spindles.

J—Multiple spindle drill used in the Excelsior plant in the manufacture of Excelsior motors, working in conjunction with a jig drilling flange holes for a motor end-plate.

K—Special multiple spindle equipment used for grinding valves in cylinders for National motors so contrived that the grinding spindles reverse on a third of a revolution, and the grinding discs lifts off of the valve seat at the dwell point of reversal thus preventing scoring of the valve seats.

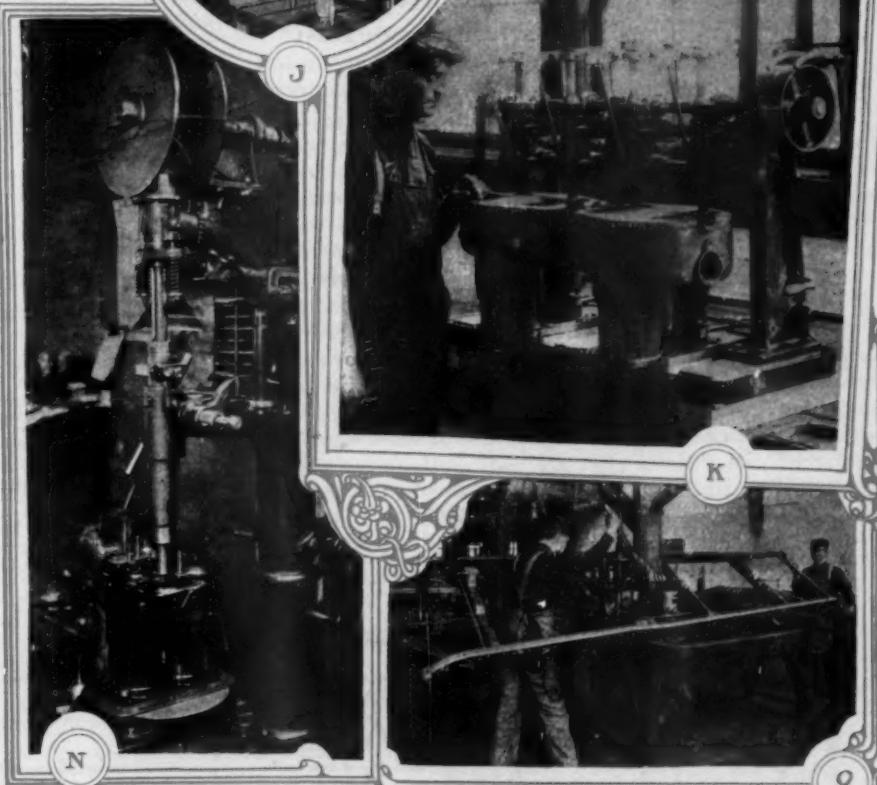
L—Multiple spindle drill used in the Excelsior plant in the manufacture of motors, shown in the process of drilling holes in the enlargements of the connecting rod with a special contrived wing cutter which faces off the enlargements simultaneously.

M—Sensitive drills as used in the Diamond chain plant for drilling sidebars and other work in connection with the manufacture of Diamond chains as employed in side chain drives on automobiles.

N—Drill press in the Premier plant rigged up for grinding valve seats of Premier cylinders so arranged that the spindle reverses on a third of a revolution and the grinding disc lifts off of the seat at the dwell point during each reversal.

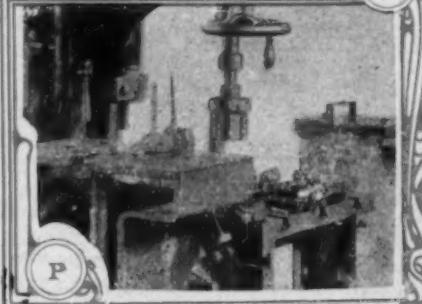
O—Improvised drill in the Premier plant drilling holes in crossbars during process of assembling the chassis frame.

P—Radial drill used in the Marmon plant in connection with a fixture with hardened bushings in the holes showing an end mill T in the socket held in the spindle S. The top portion of the fixture shows the bushings.

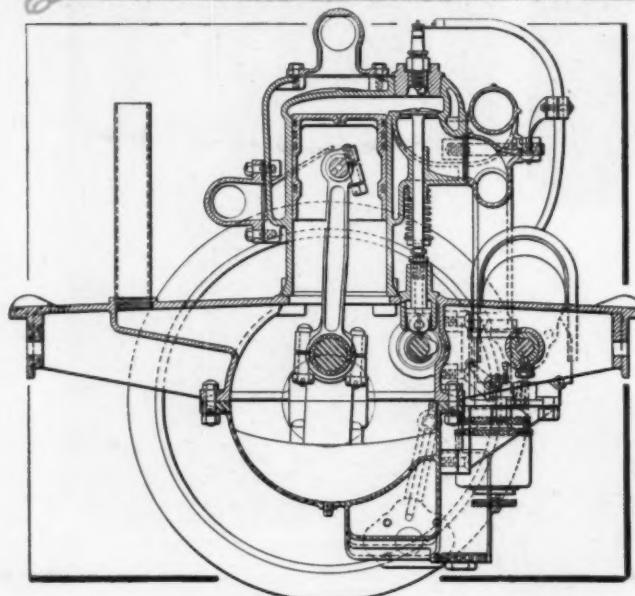


will see the production of a machine resembling standard automobiles more closely than does the long-legged critter. This latest addition to the family shows another change, to water cooling, the four-cylinder 41-4 by 51-2 engine being of this variety. The length of stroke relative to the bore puts this prime mover into the long-stroke class, which produces the power required at comparatively low speeds, this being conducive to long life. The cylinders are cast in pairs, with the T-head form, while the crankshaft is ably supported by long bearings of Parson's white brass. Three body forms conclude the line, a two-passenger runabout, a four-passenger runabout or roadster, and a five-passenger touring car. The former is designated as Model M-10, the second as Model M-15, and the last as M-20. The engine power rating is taken as forty, which at

the gear reduction of 4 1-2 to 1 would produce sufficient speed for anyone. Added to long lively springs, a wheelbase of 115 in. makes life worth living in the car, while the tires have the most unusual size of 37 by 5 all around. Considering the weight of the complete car, this tire equipment is one of the most liberal on the market.



THE N.Y.A.A.M. SHOW



Section through National engine, showing the sump for the oil to collect in and which acts as a source of supply at all times. The dotted lines indicate the pump at the rear end.

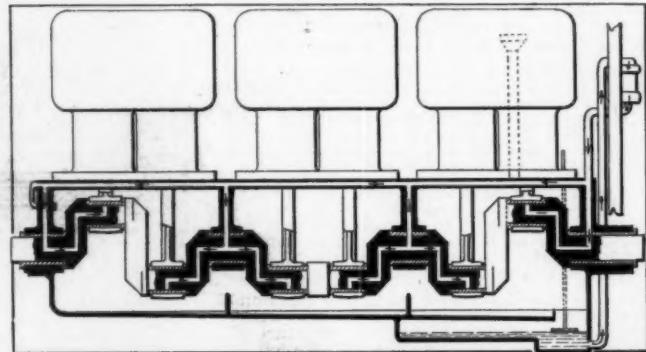
MICHIGAN MODEL D IS A STEAMER COMMERCIAL

Made by the Michigan Steam Motor Company, this model, as it is displayed at the show, may be briefly described as follows:

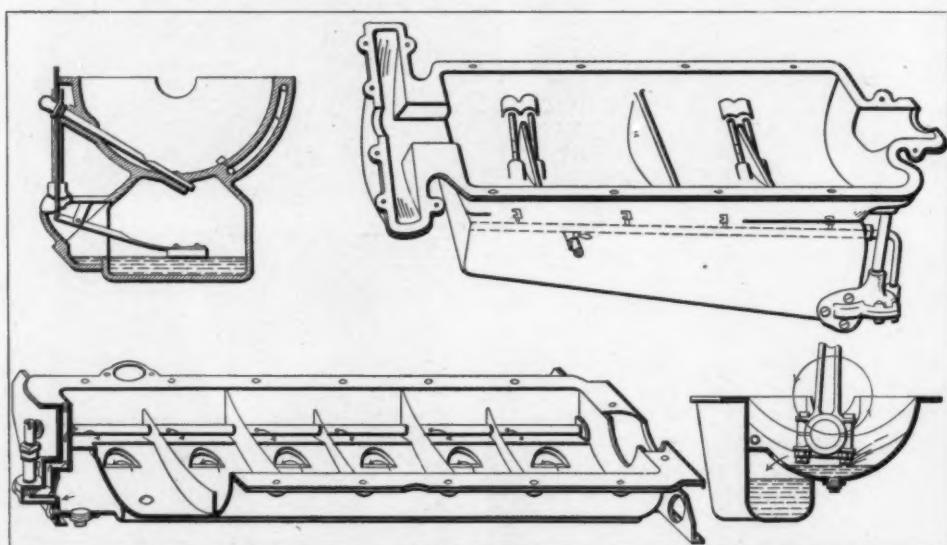
It is a 3-ton truck; body work to order; price \$4,000. The power plant has eight cylinders of the type known as twin quadruple compound, with a three-inch stroke. The engine is located under the foot-board, and the steam boiler, which furnishes the energy in acceptable form, is located under the driver's seat. The type of boiler is designated as semi-flash, and a flat tube condenser is used in conjunction with the system. Water is maintained at a constant level, and compactness as well as economy is the aim of the designer. Lubrication is by splash, control is substantially automatic, and one speed change is provided in the transmission gear system. A double side-chain drive transmits power to the rear (traction) wheels, and the wheelbase is 140 in. with a 66-in. tread. The chassis frame is of the channel section, reinforced, and Timken axles are used at front and rear. The weight of the truck is 4,500 pounds, according to specifications, and 4 1-2-in. front tires (solid) are used in conjunction with the same size "dual" tires on the rear traction wheels.

ONLY TWO MIDLAND MODELS, K AND L

No attempt will be made by the makers of the Midland to cover the entire field with a line of cars as long as your arm, but rather, the factory will concentrate on two models, to be known to the trade as Models K and L. A short and rather hurried mention of the salient points of the design of these two will serve to put them in the position of speaking for themselves, as they are well able to do. Model K is a 50-horsepower car, with an engine of four cylinders, 4 3-4 by 5 1-2, cast in pairs, and of the L type. The wheelbase 118 in., the tires 36 by 4, the body well upholstered, and the price \$2,250. Passing on to Model L, that is a car of 115 in. wheelbase, and 34 by 4 tires, equipped with a 4-cylinder engine of 4 1-2-in. bore and 5-in. stroke. The makers rate it at 40 horsepower. These cylinders are of the T-head type, differing from the larger ones, but like them, cast in pairs. The clutch of this car, both models, will be remembered as one of the first of the three ring metal-to-metal clutches. The same form is used to-day. This model sells at \$1,800. A very light weight for the complete car is claimed. Frictional losses are lowered to the minimum possible point by the liberal use of ball and roller bearings throughout. Ball-bearings are used in the clutch, front, and rear axles, while the transmission is mounted upon tapered rollers. The material used in the crankshaft, transmission gears, shafts and other parts which have to take the brunt of the work, are selected for high kinetic qualities, and, in order to accentuate these qualities the parts are suitably heat treated before use.



Oiling system of Lozier Light Six, the path of the lubricant from the pump to dashboard, to bearings and return being indicated by the small arrows.



Above, new Columbia lubricating scheme, the diagonal rod adjusting by its position the amount of overflow, and thus, the level in the case. Below, the Oldsmobile lower half of crankcase, showing overflow ports and at the right, the way the connecting rods dip in the oil.

MITCHELL MODEL S IS A "SIX"

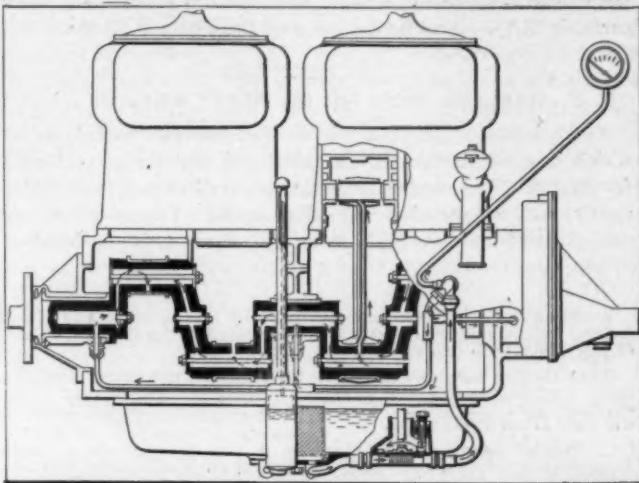
While there is a certain similarity between the respective models of the Mitchell, even so, differences in engineering detail are instituted in accordance with the designing requirement. In the six, for illustration, the frame, which has to do duty with a long wheelbase, is prevented from sagging by a heavy reinforcing plate which is riveted to the side bars at the point of narrowing and for a considerable distance along the frame; this reinforcing plate adds rigidity to the bars and fully offsets the cranking moment. The cylinders of the Model S are cast in pairs; they are nested symmetrically on a well-designed crankcase, and straight-line designing obtains throughout the work. The rear suspension is through a three-quarter platform type of springs with a lateral mem-

THE N.Y.A.T.M. SHOW,

ber faced to the rear, and the support is by means of a stout bracket which is riveted to the rear cross-bar of the chassis frame, which bar is especially designed in view of the work it must do, and the corner fastenings at the intersections of sidebars are also strengthened. The brakes, of which there are two sets, in conjunction with a pressed-steel drum for each rear wheel, connect by means of straight-line rods to the operating shaft which crosses in front of the spring suspension, and between this shaft and the pedal control an equalizer is placed for each set of brakes, thus assuring equality of pressure at the instant of application, and skidding at this critical moment is thereby thwarted. In Mitchell cars, pressed steel is utilized to a very considerable extent, and castings are, therefore, not employed. The life of these cars is lengthened in view of the character of the kinetic materials used, and what is equally to the point, the cost of upkeep becomes a negligible quantity.

MOLINE \$1,500 MODEL IS POPULAR

This model has a four-cylinder motor which is rated at 25.6 horsepower (A. L. A. M.). An illustration given elsewhere shows how the transmission gear is connected with the motor case by a pair of I-section arms which sweep around the flywheel. The cylinders of the motor are in pairs, with a bore of 4 inches and a stroke of 4 1-2 inches, which puts the motor in the long-stroke class. The radiator is of the tubular type; ignition is by a Splitdorf magneto and a battery auxiliary, and the power is transmitted by a cone clutch through a three-speed selective transmission gear and propeller shaft with suitable universal joint to a live rear axle of becoming characteristics. The motor bear-

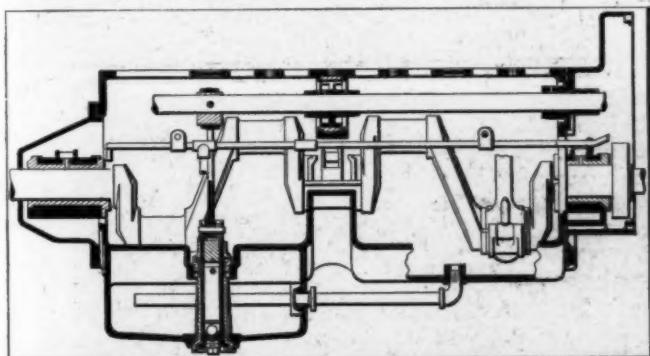


Marmón is well known for the bored-out crankshaft, this being done to furnish a channel for the lubricating oil to circulate through. The arrows show its progress to the bearings.

character of the workmanship which is displayed in the power plant and elsewhere, is up to a fitting standard of Moline work.

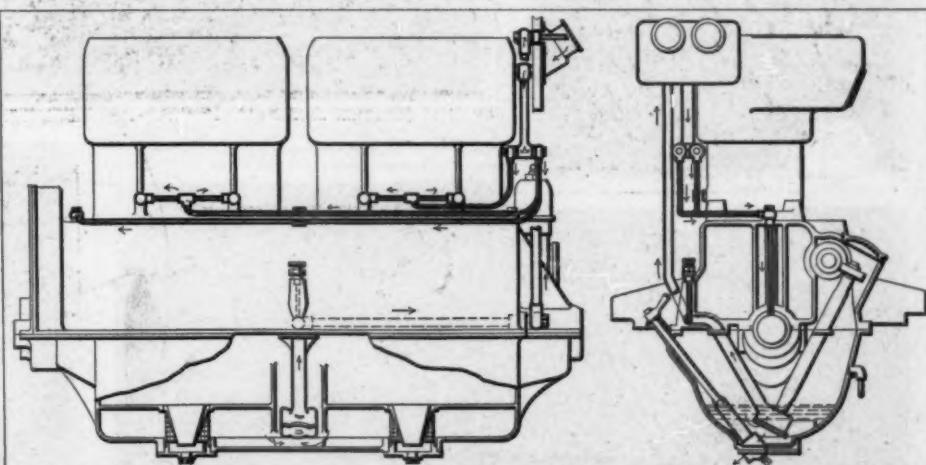
MORA PRODUCES A NEW LIGHT FOUR

Besides the favorably known Mora Forty, this company will this season produce a new light car, to be known as the Mora Twenty. Besides being small, of comparatively small power, it has the merit of not being very high in price. The motor is of four cylinders, cast in pairs, water-cooled and by the thermo-siphon action. Cylinder sizes are 3 1-4 bore and 3 1-2-in. stroke. It is a very neat little power plant and attracted much favorable attention at the Palace Show, where it was seen for the first time. Ignition is by both magneto and battery. The transmission, located at the rear axle, affords two speeds and a reverse, operating selectively. The wheelbase is 84 in. for a two-passenger runabout body, while the tread is standard. Engine bearings are plain, but elsewhere rollers are used liberally. Thirty-two by 3-in. tires are used for both front and rear wheels, which size is ample in view of the fact that the weight is but 1,300 pounds. To add to the attractiveness of the mechanical features taken as a whole, a Renault type of sloping bonnet is used with a dashboard radiator. This gives a very Frenchy effect, while actually adding to the effectiveness of the cooling system. Model Forty is about the same as last year, with the



Crankshaft lubricating method used on the new four-cylinder Reo, the plunger pump in the oil well furnishing a supply to the bearings through horizontal tubes. Pump drive is by eccentric.

ings, including the crankshaft, are plain, but roller bearings take the exacting work at all other points. This car weighs 2,100 and has 34 by 3 1-2-inch tires on all wheels. Among the features which make it possible to class this automobile in standard practice is an I-section front axle, which is die forged and heat treated, the special steel channel-section frame, with scroll full elliptic springs in the rear and half elliptic springs in front. The cooling belongs to the thermo-siphon class, of which there is a large school, and the control for the carburetor and ignition are properly nested on the top of the steering wheel. Accessibility attains at every point in the construction of this car, and the



On the American motor, the oil pump is set on an inclined shaft, which is worm-driven from the crankshaft. Besides the bearing leads, there are two for the cylinders, each one dividing and supplying two cylinders. The usual telltale on the dash is used.

exception of more power, brought about by an increase in the bore of the cylinders, which now measure 4 1-2 in. in diameter. Aside from the cooling system, in which a centrifugal pump is used to circulate the water, the details of the larger car are like the smaller one just described. The little car sells at \$1,050, while the price of the Forty is \$2,500.

OAKLAND FROM THE BIG PLANT AT FLINT

The product of this plant is divided into two units, one of which is a popular priced car, at \$1,250, and the second sells for \$1,700. The smaller of the two cars has a four-cylinder motor, with a 4-inch bore, and like stroke. The cylinders are cast in pairs and cooling is done by water, which is handled

A—Shows a Cincinnati milling machine in the Excelsior plant with a large inserted milling cutter facing off the bottom flange of a T-head twin cylinder.

B—A milling machine in the National plant, mounting straddle mills and facing off the crankpin enlargements of four connecting rods, the latter being held in place by clamps against the face of an angle plate.

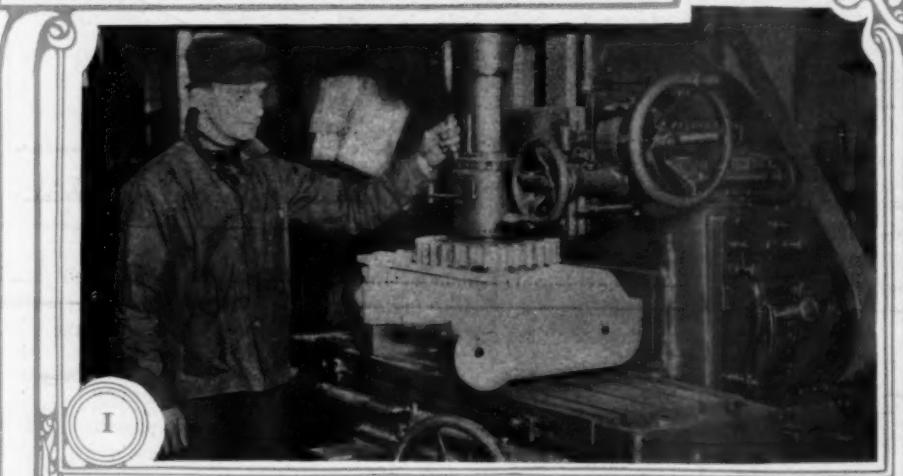
C—Special heavy milling machine in the Premier plant, with large inserted tooth, cutting discs, facing off port bosses on Premier twin cylinders. The milling cutters are set to straddle the cylinder, thus completing the facing on both sides simultaneously.

D—A heavy vertical mill in the Inter-State plant, with an inserted cutter head, facing off the aluminum top half of an Inter-State motor crankcase.

E—A No. 4 Cincinnati milling machine of the vertical type, with an inserted cutter milling head facing off enough cylinders for one time as used in Excelsior motors.

F—Special milling attachments on an Ingersoll milling machine as used at the Rambler plant for facing off the bottom flanges of enough cylinders for one motor at one time.





by a centrifugal pump through a tubular radiator. Ignition includes a magneto, and oiling is positive, a pump serving for the purpose. In the mechanical control, a disc clutch cooperates with a selective three-speed sliding gear and the 100-inch wheelbase, with a 56-inch tread, adds to the good performance of the car. This car rolls on anti-friction bearings, weighs but 1,800 pounds, and 32 by 3 1-2 inch tires on all wheels have an easy time of it. The plant, which has assumed enormous proportions of late, is one of the large undertakings of the year, and a visit to this establishment makes one of the most pleasant surprises which a newcomer is likely to experience in the rounds of this big infant industry. Elsewhere in these pages is to be found a cut of the rear end of the Oakland runabout, showing rumble seat and gas tank.

G—Special milling machine of the Ingersoll type as used in the Metzger plant for facing Everitt motor cases in gangs. This is an excellent illustration of the most modern practice.

H—Special vertical mill as used in the National plant for reaming connecting rods to an exact size and other precise work of an equivalent character.

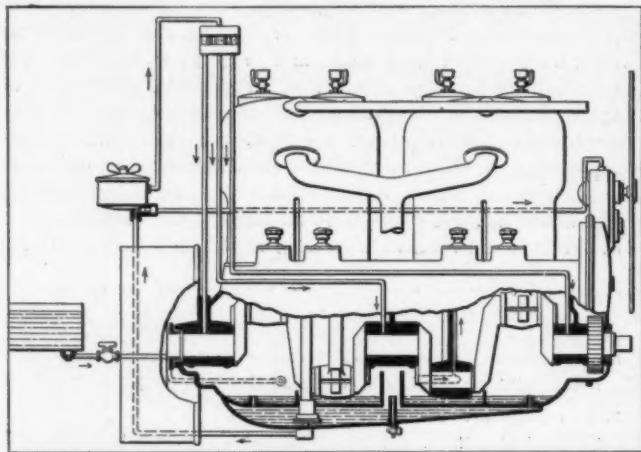
I—Vertical mill in the Excelsior plant, with a large inserted tooth cutter, used for facing off motor cases and kindred work.

J—Garvin mill in the Moon plant with a large inserted tooth cutter facing off the upper half of an aluminum crankcase.

K—Brown & Sharpe gear cutting milling machine as used in the Moon plant, shown in the process of cutting half-time gears employing the fixed cutter principle.

L—Special cylinder boring machine with four spindles so arranged as to fix the centers and bore cylinders of the block type as used in Everitt motors made by the Metzger Manufacturing Company. This is the type of design and type of machine tool which may truly be characterized as right up-to-date, the tool allowing of the rapid and very economical production of the motor as turned out by the designer of the car. Without a doubt this skillful workman knew of the possibilities.

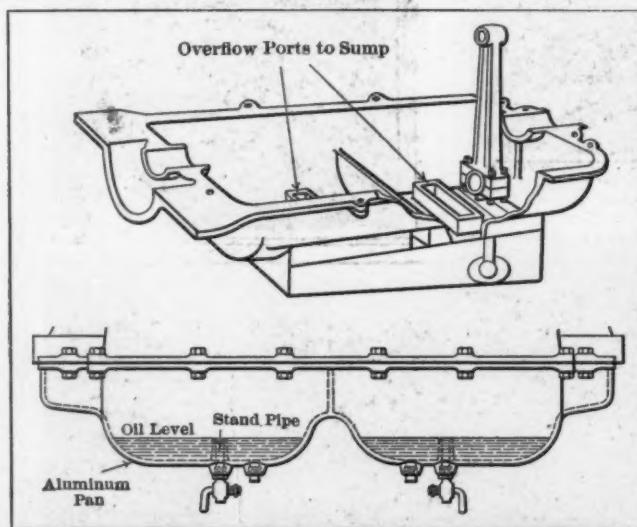
THE N.Y.A.T.M. SHOW,



Circulating system of lubrication as adopted by the Royal Tourist. The pump forces oil through sight-feeds on the dash to the three main crankshaft bearings, and also to the timing gears; the strainer is very accessible.

CLOSE COUPLED OLDSMOBILE LIMITED POPULAR

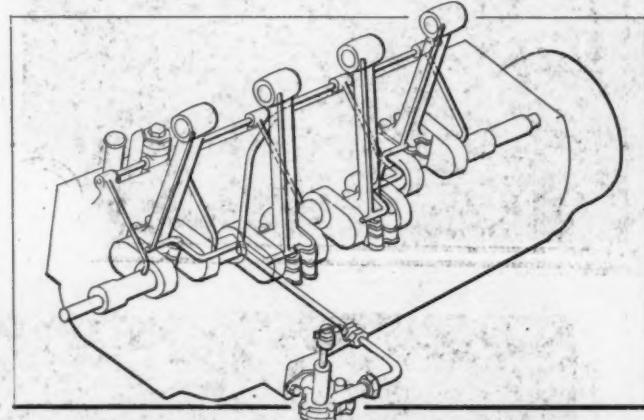
This car, which is listed at \$4,600, has a wheelbase of 130 inches, standard tread, and the distinction of using 42 by 4 1-2-inch tires on all wheels. The brakes for the foot-lever control are external on the rear wheels, and the brakes, which are under hand control, are internal extending on the rear wheels. This car has a six-cylinder motor with a bore of 4 3-4 inches, and a stroke which brings it into the class with the squares. A cellular radiator in conjunction with a pump maintains a sufficient cooling, and the ignition under working conditions is by means of a Bosch magneto; since the dual system is employed, emergency ignition is cared for in the same system. The transmission is a selective type with four forward speeds and reverse, so that in road work the car performs under the best conditions of economy, with the added advantage of a high rate of acceleration, due to the fourth speed in the transmission system. The leather-faced cone clutch is of the latest and most approved design, and easy riding is assured by the application of semi-elliptic springs in front, and three-quarter elliptic springs of great capacity on the rear axles, they being 54 1-2 inches span, and the plates are 2 1-4 inches wide. This car has the further advantage of a baggage rack, coat rail, foot rest, top, speedometer, glass front, Prest-O-Lite tank, and 9-inch headlights.



Two ideas of lubrication contrasted: Above is shown a crank-case in which a separate trough is provided for each connecting rod big end; below is the Locomobile idea, in which two big ends share the same trough.

FOUR PACKARD MODELS TO A DISCRIMINATING PUBLIC

From the "Eighteen" which is a runabout at \$3,200, to the "Thirty" as a touring car at \$4,200, is the normal span of Packard endeavor, which is not taking into account any of the body creations as limousines and landaulettes, of which the Packard plant has produced many noteworthy examples. The "Eighteen" as well as being a runabout of distinction, is also fitted out with a touring body for such of the Packard clientele as expresses a preference for more seating capacity. The "Eighteen" motor is a characteristic design, with four water-cooled cylinders, 4 1-16 by 5 1-2 inches bore and stroke respectively, the cylinders being cast in pairs. Cooling is accomplished effectively by Packard honeycomb type of radiator, and the water is circulated by a centrifugal pump. The main ignition system consists of an Eisemann magneto, and for auxiliary work, a coil and storage battery is employed in each of the models. The transmission gears for all the models, as well as the "Eighteen" is a three-speed selective with reverse, mounted on the rear axle, of which it becomes a unit. The rear axle construction in cars of this make, has become famous as a Packard idea, and the germ has propagated until to-day the scheme is broadly used. The "Eighteen" as a runabout, has a wheelbase of 102 inches, but as a touring car, the wheelbase is



One pump may give a positive feed to thirteen points, as is explained by the diagram showing the Knox practice. From a manifold the oil passes to the five main bearings, thence to the big ends and finally, the piston pins.

increased to 112 inches. Ball or roller-bearings are used at all points except in the motor, and in the "Eighteen" runabout model the tires are 34 by 3 1-2 in front and 34 by 4 for the rear.

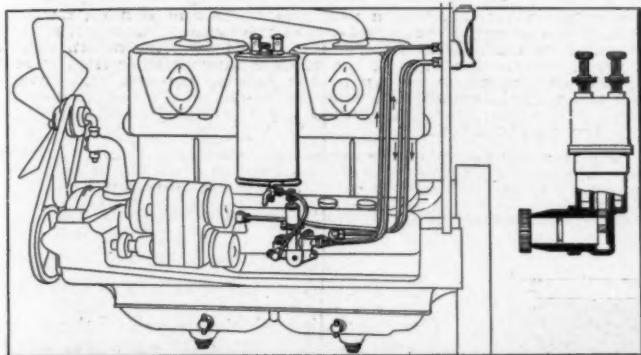
PAIGE-DETROIT IS A TWO-CYCLE ROADSTER

The price of this automobile is \$800, and it is provided with a 2-cycle, 3-cylinder, water-cooled motor (valveless), of rather novel design, suspended at three points on a channel section chassis frame. The bore of the cylinders is 3 3-4 in. and the stroke is 4 in. The power rating is 25 horsepower, and ignition is by a magneto. An automatic force feed oiler is used to attend to this important matter and cooling is by thermo-siphon with a radiator which is represented to be adequate for every need. The wheelbase is 80 in. and 56-in. tread, while the road wheels are fitted with 32 by 3-in. pneumatic tires. A sliding gear gives two forward and reverse speeds, the clutch is leather faced, of the cone type, and the side-bars of the frame are said to be nickel steel. The brakes are all on the rear traction wheels and consist of a working and an emergency set, the one internal expanding and the other external constricting. The car is swung low; rear cross spring is half-elliptic, and is so suspended as to enable the frame to come as close to the ground as flywheel clearance will permit of. The general appearance of the car is very much in line with advanced designing.

THE NATIONAL SHOW

PALMER-SINGER LINE INCLUDES FOOURS AND SIXES

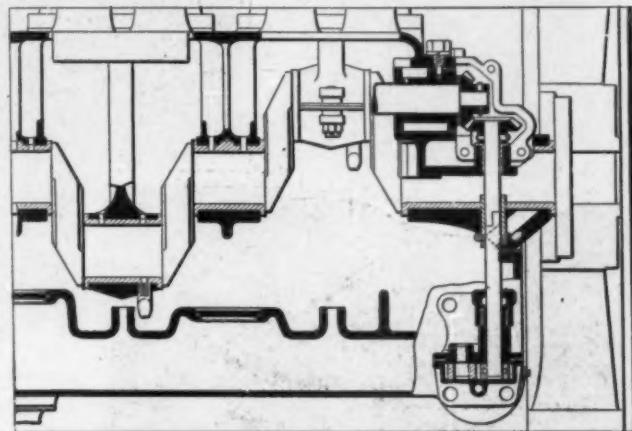
Many models at many prices, in both four and six cylinders, make the Palmer-Singer line of 1910 cars a very complete one. This must not be taken too literally for the company has abandoned the season and yearly model habit. However, the list at present includes the following models: XX, LXI, LXII and XXX enclosed bodies. The first-named is a chassis with a 115-in. wheelbase, standard tread, 34 by 4 in. tires, which for use with heavy enclosed bodies is altered to 120-in. wheelbase, while the tire equipment remains the same. The power is supplied by a four-cylinder, 4 1-4 by 4 1-2-in. engine, of which the cylinders are cast in pairs. A Bosch magneto furnishes current for the high-tension ignition system with batteries in reserve. Cooling is by water with a centrifugal pump and honeycomb radiator. Disc clutches and four-speed selective transmissions are used on all models. The price of the XXX with touring body is \$2,250, and with landaulet body, \$3,650. Both other models are higher powered, LXI having a six-cylinder 4 3-4 by 5 1-2 engine, rating at 54.1 horsepower, while on Model LXII, the bore of the six-cylinder engine is slightly greater, 4 7-8, and the stroke the same as before. This may be had in any body form, being supplied as a three-passenger runabout (LXI) for \$3,250, and as a five-passenger touring (LXII) for \$3,500.



Packard has a nicely worked-out lubrication system, employing two pumps, of the plunger type; these deliver oil through sight feeds to the two compartments of the crankcase. A reserve supply is in the tank between the cylinders.

PATERSON THIRTY AND WHAT IT SHOWS

A 4-cylinder water-cooled motor, of the 4-cycle type, with cylinders cast in pairs, 4 by 4-in. bore and stroke respectively, giving an A. L. A. M. rating of a trifle over 25 horsepower. Instead of a pump being used to circulate the cooling water, a suitable radiator for thermo-siphon cooling is used, and the water piping is made accordingly. Ignition is by a double system, which includes a magneto, coil and battery. In lubricating, a constant level splash is maintained by means of a plunger pump type of lubricator. A Schebler carburetor takes up the feeding of the fuel to the motor, and control includes a type of cone clutch which is leather faced, and springs press the leather into good engagement. The transmission includes a three-speed (and reverse) sliding gear system, which is selective and engages a carbon steel propeller shaft through universal joints. The rear axle to which the propeller shaft runs is of the semi-floating type, using roller bearings; the front axle is also tubular, but the bearings are of the ball type. All brakes are on rear wheels and comprise a working and emergency system, the one being internal expanding and the other is external constricting. The gear ratio is optional within practicable limits, and the road wheels are of the artillery type, fitted with demountable rims, which take 32 by 3 1-2-in. pneumatics. The wheelbase is 104 in. with a tread of 50 in., and the springs are full elliptic front and rear. With a motor of this rating and state of mechanical perfection, it is not too much to expect that the speed of the auto-

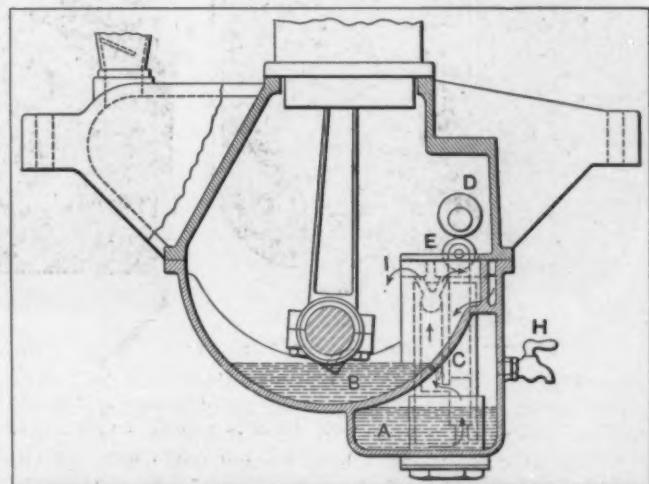


Cross-section of Overland oil pump, of the gear type, driven by a vertical shaft and bevel gears from the camshaft. The lower half of the crankcase, with the pump, can be removed without disturbing the drive.

mobile will range between 5 and 50 miles per hour, and, as for appearance, it is that due to black leather upholstery, blue body, yellow gear, or certain options. It is made at Flint, Mich., by W. A. Paterson Company, a newcomer in the business.

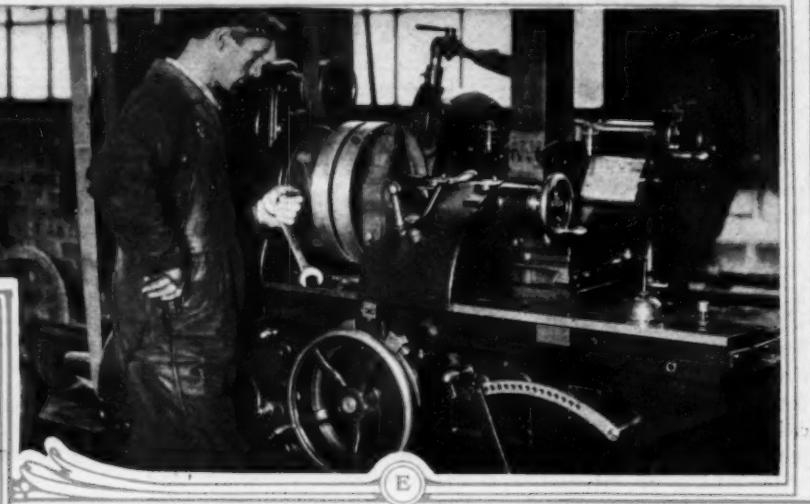
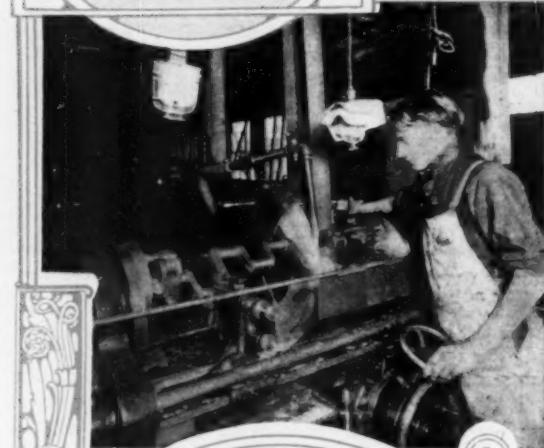
PEERLESS DESIGN FEATURES ARE CHARACTERISTIC

From the Model 27 at \$4,300 to the Peerless "28" at \$6,000, runs the gamut in the matter of size with no suspicion of a change in the standard fixed by this well-known company. These models when placed alongside of each other are excellent illustrations of consistency, in which, as the spectator is bound to observe, the things which are good in one car are equally representative in another. Model 27 has an A. L. A. M. rating of 38 horsepower, has a runabout body, with a rumble, and the motor is a 4 7-8 by 5 1-2 inches bore and stroke respectively, cylinders cast in pairs, and cooling is done with a honeycomb radiator and gear pump. A Bosch magneto serves in the main, for purposes of ignition, with a storage battery and suitable coil for the rest. Ignition is positive with a mechanical force feed, and the Peerless expansion band form of clutch is continued. All Peerless models are equipped with a selective four-speed transmission, are shaft driven, and the runabout has a wheelbase of 118 1-2 inches, with standard tread, and among other designed features which take on standard characteristics,



The Johnson Service Company uses a plunger oil pump, actuated by an additional cam on the camshaft, whereby a constant level is maintained in the crankcase. The pump is easily removable from below without complication.

PLATE VI.

GRINDING
METHODS
OBTAIN

A—Excelsior method of grinding crankshafts, in which speed and accuracy are definitely aimed at. This is a Landis No. 24 grinder, which is much used in this class of work. In grinding crankshafts it is the practice to allow about 0.010 of an inch to be ground off, and the rough machining work is done at high speed on special low swing lathes, using Novo or other grades of high-speed cutters. The fact that the grinding is done as a final operation enables the lathe man to dig in at a rapid pace, and if the shaft does deform (back away from the tool slightly) in the process of roughing, it makes no difference in the final operation—the work will come off of the grinder properly finished.

B—In the Excelsior plant at Chicago, showing a grinder on piston rings, using a magnetic chuck on a flat plate to hold the rings during the grinding operation.

C—In the Excelsior plant, showing a new type of Landis grinder, working on integral camshafts grinding over the faces of the cams as well as between them on the round of the shaft. This tool is of the greatest advantage in this class of work, and the accuracy of the cams is much nearer than in any other way. The attachment is set up in the grinder centers, and swings away towards the work in conformity with the shape of the cam, a master cam of the required shape being responsible for the travel of the work in its relation to the grinding disc.

D—In the Rambler plant at Kenosha, showing a Besley grinding machine in the process of grinding off the ends of spiral springs, which, in turn, are placed in holes in a fixture which was contrived for the purpose.

E—In the National plant, grinding the faces of expanding brake shoes.

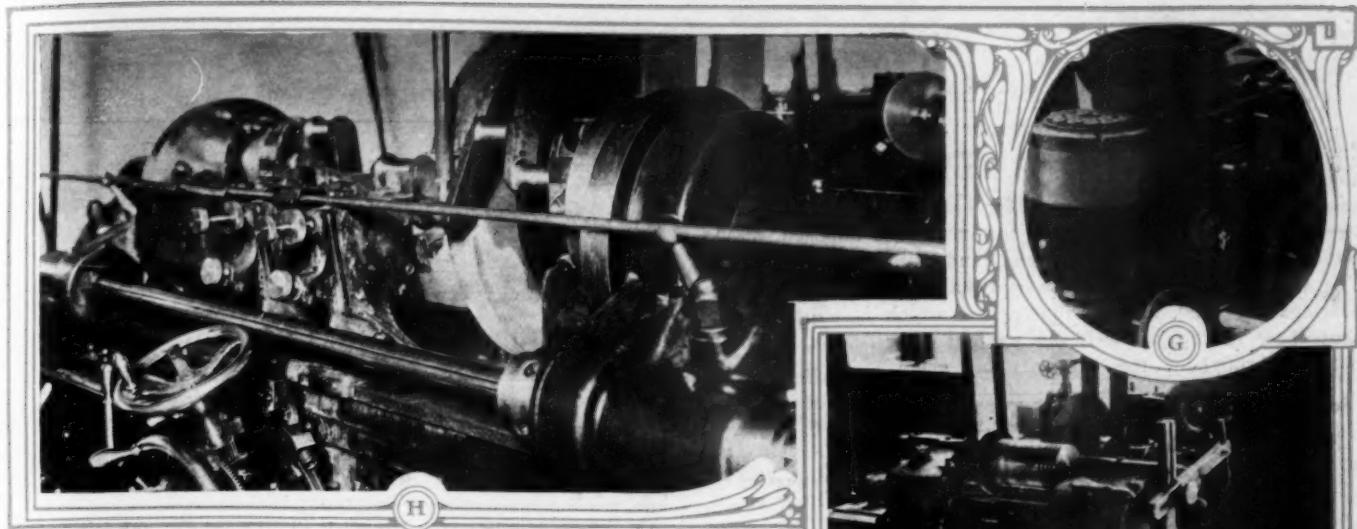
PENNSYLVANIA HAS VALVES IN CAGES

The illustration which is given of the motor under discussion shows how the valves which are in the heads may be readily removed for inspection and grinding, or they may be ground in place. There are four Pennsylvania models with power plants ranging from 28.9 to 54.1 horsepower, and the larger size is a "Six" with a 4 3-4 by 5 1-2 inches bore and stroke of cylinders respectively, cast in pairs, water-jacketed, cooled by circulation from a gear pump through a cellular-type radiator, and the ignition is by Bosch magneto with a battery auxiliary. The magneto is placed on the left side of the motor back of the gear pump, and the pump in turn takes its power from a gear which meshes with one of the half-time gears. All gears are in a grease-tight housing at the front end of the motor, and the magneto, which is on a shelf extending out from the top half of the crankcase, is flexibly mounted so that it may be removed and inspected without causing annoyance in the act of replacement after inspection, or if repair becomes a necessity. There are many other points of

mechanical merit, as the full floating clutch type of rear axle, selective three-speed and reverse transmission gear, with the gears of nickel steel—the spindles float on annular type ball-bearings. This maker is one of the few—the list includes Packard, Glide, Moon, Mora, Otto, Overland, Stearns, Sterling, Watt, Welch, and others—locating the transmission as a unit with the rear axle, the differential case housing the gears and shafts.

plain bearings are used in the crankshaft, but ball-bearings obtain for the rest, they being of the annular type. In all Peerless cars the tires are 36 by 4 in. front and 36 by 5 in. rear.

A new little car has just been brought out, which has all of the best features of the larger cars, and a number of little individual characteristics of its own. Thus, the driver, with all control levers is located on the right-hand side.



F—In the Moon plant, showing a grinder working on pistons to bring them to exact size. Grinding pistons is a special process or operation, which is conducted in the plants which are doing work of the very accurate sort.

G—In the Thomas plant, showing an application of a flat grinder fitted with a magnetic chuck.

H—In the Inter-State plant, showing a grinder on crankshaft work.

I—In the Metzger plant, showing an application of a surface grinder, facing plates to make the joints tight, and eliminate the use of packing.

J—Heald grinder on cylinder work in the Excelsior plant, showing the cylinder bolted to an angle plate and the grinding disc on the end of a long, tapered spindle, which is eccentric to the bore of the cylinder. The result is very accurate as respects the character of the work, and the time required is much shortened over that of other methods. The method of setting up the cylinders is not the same in the several plants, and, in some cases, a turntable is employed, it offering the advantage of allowing the workman to set-up while the grinder is working.

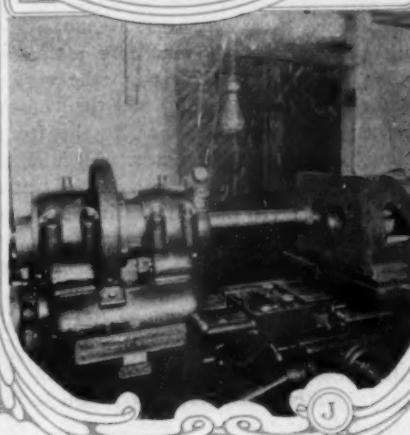
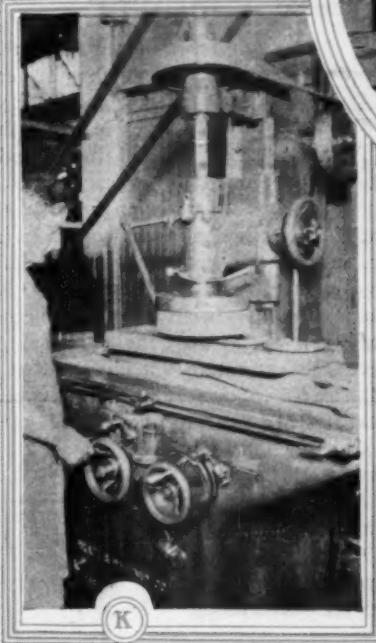
K—Pratt & Whitney surface grinder in the Excelsior plant finishing (by grinding) plates as used on Excelsior motors, the idea being to make all joints tight by grinding rather than by the use of packing. A magnetic clutch holds the work in place on the platen of the grinder. This grinder is normally available for all classes of surface grinding work and the magnetic chuck is very useful in making quick and accurate adjustments of the work in the setting-up process. In some shops this form of grinder is used for facing off manifolds, and, since the facing is done with great accuracy, it is unnecessary to employ packing under the faces of the manifolds, so made, to maintain tightness.

PIERCE-ARROW STAGES SIX SIXES

There are two models of the "Thirty-six," as many more of the "Forty-eight," terminating with an equal number of the "Sixty-six." Possibly the runabout "Thirty-six," at \$3,850, is the popular type for the man with red blood in his veins, but for real comfort, and touring under pleasurable conditions, a selection from the more pretentious models offers wide possibilities. The runabout "Thirty-six" has six cylinders, 4 by 4 3-4 bore and stroke respectively; they are cast in pairs, and a honeycomb radiator, aided by a centrifugal pump, is responsible for the cooling. Ignition is by Bosch magneto, with a storage battery and suitable coil auxiliary, while lubrication is on a most ambitious basis, as illustrated elsewhere in this paper. All Pierce models are shaft-driven, and the runabout model under discussion has a wheelbase of 119 inches, with a tread of 55 inches, pressed steel frame, plain bearings in the motor, Timken roller-bearings in the road wheels, and annular type ball-bearings elsewhere. The tires on this model are 36 by 4 all around, in fact, this maker is addicted to very large tires, which will be found on all models, regardless of power.

POPE-HARTFORD OF MANY UNEXCELLED FEATURES

Model T sells for \$2,750, has an A. L. A. M. rating of 29.7 horsepower, and is built for touring. The power plant includes a four-cylinder motor with cylinders 4 5-16 by 5 1-8-inch bore and stroke respectively, cast in pairs, water jackets integral, and



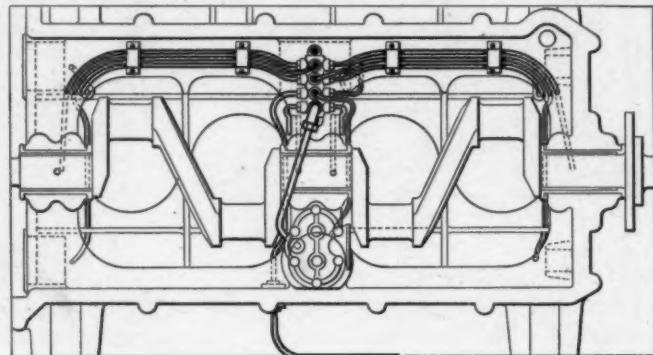
cooling is accomplished through circulation by a centrifugal pump, feeding a characteristic type of Pope-Hartford radiator. Ignition is by Bosch magneto, with a storage battery and coil as supernumerary, and lubrication is positive through the good office of a pump. The cone clutch is of such excellent design that flywheel effect is eliminated and strength obtains to an adequate extent. Speed changes are depended upon primarily,

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due to the excellent flexibility of the motor, and then, by suitable manipulation of a three-speed selective type transmission gear, with reverse of course. The I-section frame of special steel is shaped to sustain under the conditions imposed, taking into account a 118-inch wheelbase, and a tread of 56 inches. The motor has three plain bearings and for the rest roller-bearings are used, and an illustration, which is afforded, will show how thoroughly well the straight-line idea in designing obtains throughout the cars of this make.

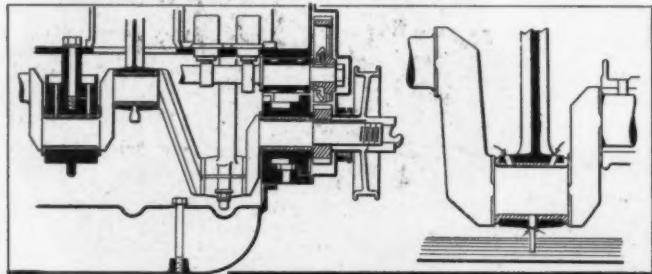
FOURS ONLY FROM YORK PULLMAN FACTORY

Four four-cylinder models will comprise the entire output of the Pullman factory at York, Pa. These are styled O, K and M, selling at \$1,650, \$2,000 and \$3,500 respectively. There is another newer model also a four, which sells at \$3,000. The motor on the lowest priced of the lot is of 4-in. bore and 5-in. stroke, while that of Model K is larger, being 4 1-2 by 4 3-4, a larger bore but a shorter stroke. The newer model has a still more powerful engine, the dimensions of which are 5 by 5 1-4, a still shorter stroke relative to the bore. In the highest-priced car, Model M, a 45-horsepower engine is utilized, the sizes of which are 5 1-4 by 6, which is again a long stroke as compared with the bore. In all of these models, the cylinders are cast individually, the ends being given up to a very large core opening. The ends, too, are flanged and these flanges are finished so as to bolt up close to one another. When set into place, each cylinder thus is bolted fast to the one on either side, making the whole as a block casting, yet insuring clean, accurate castings



On the Stoddard-Dayton the oil is distributed through individual pipes from a manifold in the middle of the case; the pipes are accessible for inspection on removing the lower half of the crank-case, which may be done readily and quickly.

price is \$2,500, at which figure is included magneto of the high-tension type and from a reputable factory, full set of five lamps, gas tank for the headlights, and tool box containing a set of tools. This, it will be remembered, is one of the Rambler cars which carry the spare wheel with fully inflated tire on the right-hand side, handy to the driver. The running board is notched to let the lower part of the spare wheel rest in it, thus saving space, and insuring a tight hold on the wheel. In case of tire trouble, punctures, or any similar emergency, it is a matter of but a few moments' work to remove the defective member, substitute the extra one, and go on one's way.



Inter-State uses flattened scoops on the caps of the connecting rod big ends to secure for these their supply of oil; National, as shown on the right, has in addition two oil holes drilled through on the upper side.

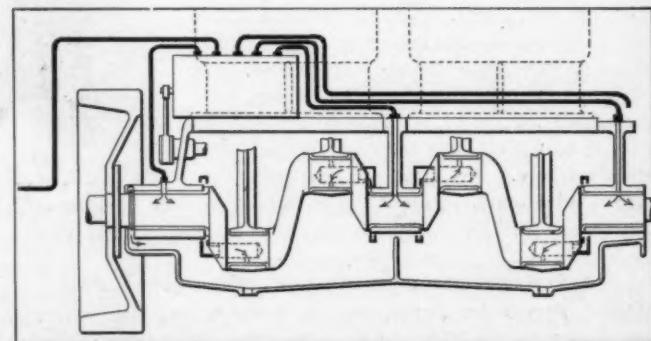
and no trouble with cores. The water—circulated by centrifugal pump—passes in at the rear core plate, thence around the last cylinder, into the third through the very large opening at the end of the cylinder casting, and then on through the other two cylinders in a similar manner, to the front, where it passes up and out to the cellular radiator. All models have standard tread, the wheelbases increasing with the power and price as follows: 108 in., 112 in., 110 in. and 124 in. Engine bearings are five in number, one between each pair of cylinders and one at each end, and of the plain type. All transmissions run on balls, while for the axle, rollers are used exclusively. Weight, always an important question, has been well cared for and properly proportioned. The weights vary upward thus: 25.6-horsepower touring, 1,800 pounds; 32.4-horsepower touring, 2,400 pounds; 40.0-horsepower roadster, 2,600 pounds; and 44.1-horsepower seven-passenger touring, 3,500 pounds.

THREE BIG-VALUE RAMBLERS FOR 1910

Figures have been utilized to designate the three models, which the immense Kenosha factory will produce in large quantities during the present season, these being Models Fifty-three, Fifty-four and Fifty-five. Of the three, the last-named, Fifty-five, is the big car. This is rated at 45 horsepower and has a three-speed transmission, operating selectively, of course. It is a big roomy touring car, seating seven comfortably. The selling

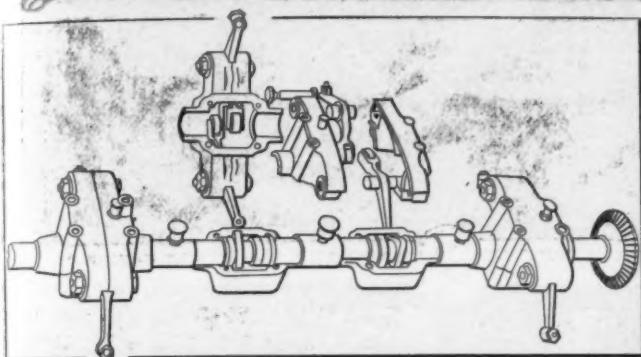
REGAL A WELL-KNOWN THIRTY HORSEPOWER CAR

This make is delivered in three models, B, F and E. The price is \$1,250, and the rating is (A. L. A. M.) 30 horsepower. Model B is a runabout; F is a touring car, and E is a baby tonneau. The power plant is common to all and comprises a motor of the water-cooled 4-cylinder type, using a patented thermo-siphon system, and the cylinder dimensions are 4 by 4 inches. The cylinders are cast in parts, ignition is by Remy magneto, with a coil and battery as auxiliary. Lubrication is by regulated splash, bearings for the crankshaft are a special grade of white metal, and the method of scraping in and inspection is thoroughly good in every way. The clutch is of the cone type, and the transmission gear is a three-speed (with reverse) selective, placed on the chassis frame in a mid-position. Two universal joints are placed in the propeller system which lead to the live rear axle, and Hyatt nickel steel roller bearings are used at all important points, including a special bearing which is placed at the axis of the universal joint on the end of the shaft tube to resist the loading at that point and relieve the clutch mechanism of any but its normal work. The weight of the car is 2,000 pounds, body work is of steel on stout, well ironed, wood framing and special



Pennsylvania retains the time-tried individual pump system; in this case the feeds are to each of three crankshaft bearings, another to the timing gears and a fifth to the gearcase.

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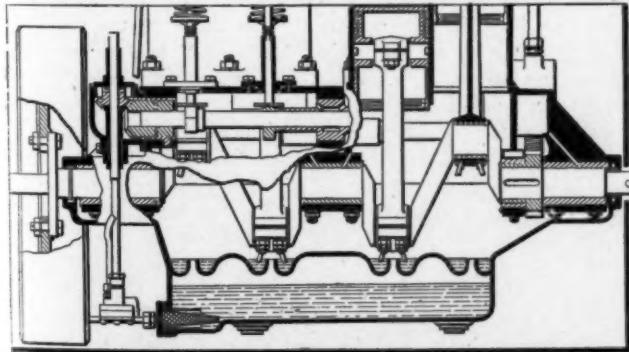


Overhead valve systems are hard to lubricate properly, but in the Jackson the problem has been satisfactorily solved. The parts are completely inclosed from dust, and oil and grease cups are liberally employed.

means is provided to eliminate noise in the body work as well as in the machinery. The tires used are 32 by 3 1-2-in. pneumatics front and rear, and the earmarks of skilled designing is to be seen at every point. Made by the Regal Motor Car Company, Detroit.

CONCENTRATION THE ROYAL TOURIST KEYNOTE

The new Model M will occupy the attention of the entire factory of the Royal Tourist Car Company, this year, being the only car put out. This has a four-cylinder, water-cooled, four-cycle engine of large size. The cylinder bore is 5 1-2 in., and the stroke, 6 in. This gives an unusual power output, although rated at but 48.4 horsepower by the usual formula. At to detail, the cylinders are cast in pairs, with valves on opposite sides. Those for the inlet are placed on the left, as is also the Bosch high-tension magneto. To the right are to be found the exhaust valves and pipe, as well as the gear-driven pump. For varying the speed of the car, four forward speeds are provided in the transmission, these operating selectively. The transmission has a mid-location, and drives to the rear axle through a very slightly inclined shaft. Motor reactions are well cared for in the bridge-constructed torque rod, while the alignment of the rear axle is maintained by means of distance rods, stout drop-forgings. Brakes are unusually large and efficient, five in number, and assisted by sprags, which are attached directly to the rear brake drums, so that it is impossible to back down a hill when the sprag is in use. The wheelbase is very long, 126 in., while the springs, too, have good length. Moreover, the latter are of alloy steel, selected for this purpose. The front springs are short and very flat, while in the rear, a platform type of suspension is used. The 12-spoke front wheels are 36 in. in diameter and carry 4 1-2-in. tires, while the 14-spoke rears are of the same size, but carry 5-in. tires. The price varies with the



The circulating pump system of lubrication is used by Haynes, with an unusually large reservoir in the crankcase base. Each big end has its individual oil trough with overflow hole to prevent an excess of lubricant.

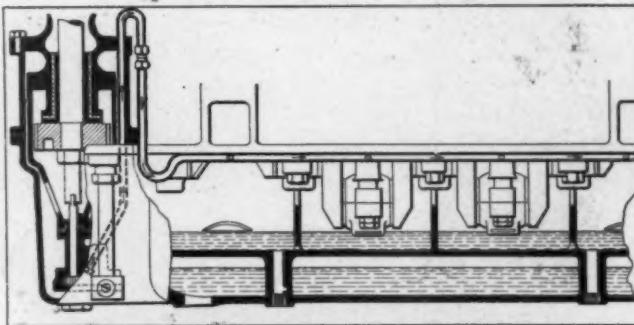
body, being \$4,500 for the touring, close-coupled cars, and roadster, \$5,700 for the limousine, and \$5,900 for the landaulet.

TWO MODELS--TWO CHASSIS FROM FATHER SELDEN

In the modest-priced class, are to be found two models, of which "The Father of Them All" is justly proud. These are the two Selden products, known as Models 35 and 29. Just as one would think, the higher numbered model has the higher powered engine, but the lower price. The former is rated at 36.1 horsepower with four 4 3-4 by 5-in. cylinders. The latter, on the other hand, has a similar number of cylinders measuring but 4 1-4 by 4 1-2 in. Both engine cylinders are cast in pairs, cooled by water circulated by centrifugal pump, ignited by storage battery with magneto as an extra, lubricated by splash and an oil pump, each utilizes a cone clutch, a three-speed selective gear set located on the main frame midway between engine and rear axle, shaft drive, pressed steel frame, plain bearing engine and roller-bearing transmission and axles. The higher-priced car is Model 29 at \$3,000 for a six-passenger limousine. This has a 114-in. wheelbase, standard tread, and 34-in. wheels, with 3 1-2-in. front and 4-in. rear tires. The price of Model 35 is \$2,000 for a five-passenger body. The wheelbase is 116 in. and the tires are the same as the larger model. The weight of Model 35 is given as 2,650 pounds.

STEARNS IS MADE IN FOUR DIFFERENT MODELS

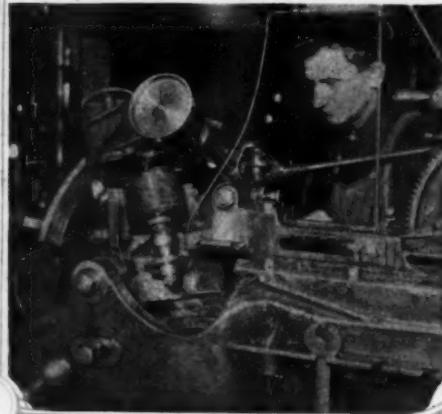
In the Stearns line of automobiles the range is between \$3,200 for the Model 15-30 and \$6,500 for the Model 45-90. The 15-30



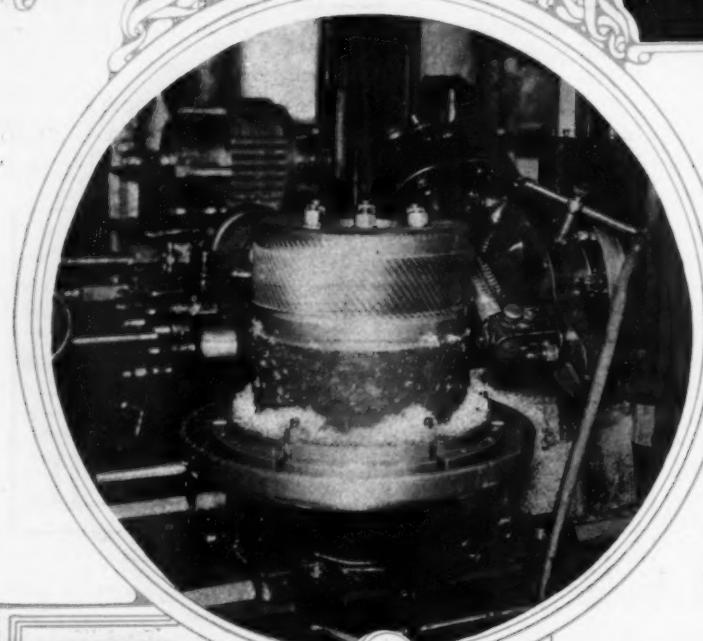
Rutenber motors, which are used on many well known cars, rely for lubrication on the splash from the connecting rods; the compartments are kept filled by a gear pump driven by a vertical shaft from the camshaft.

has an A. L. A. M. rating of the motor of 32.4 horsepower, is built for touring and seats five, and the power plant is a four-cylinder type, the bore and stroke being 4 1-2 by 4 5-8 inches, with the cylinders cast in pairs, placed vertically in the conventional way. Ignition is by a Bosch high-tension magneto, with a dry cell and coil auxiliary; lubrication is positive with a pump, and a multiple disc clutch serves to regulate the power control between the motor and the three-speed selective transmission gear, while the axle, which was previously illustrated in *THE AUTOMOBILE*, is of a special I-section with two branches mounting the gear system in the bow thus formed. The wheelbase is 116 inches, with a 56 1-2-inch tread; ball bearings of liberal sizes are used at every point, and the weight of the car is 2,650 pounds, supported by 34 by 4-inch tires on all road wheels. The character of the work as it will be found in Stearns cars involves the use of alloy steel to a very considerable extent, and selected grades of "special heat" carbon steel are employed in such parts as experience dictates. The springs upon which the chassis frame suspends are, with wide plates, made of alloy steel, and eyes at every point are reamed, bushed, and provided with grease cups. As a further indication of the character of the Stearns work, reference may be had to the transmission elsewhere in this article.

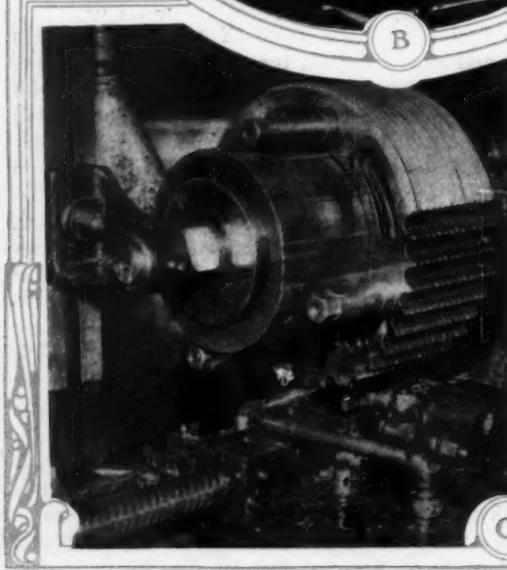
PLATE VII.
HOW GEARS
ARE FASHIONED



A



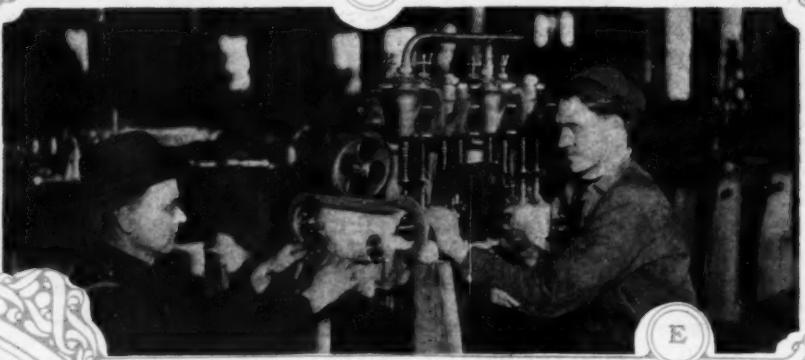
B



C



D



E

A—Bilgram bevel gear shaper cutting teeth on a differential gear. This type of tool was utilized in many plants for the purpose of making accurate bevel drives and free working differentials. This photograph was taken in the Woods plant.

B—In the Woods plant, showing a German system of hobbing gears, the particular example being that of the spiral gear as used in the transmission system on Woods Electrics.

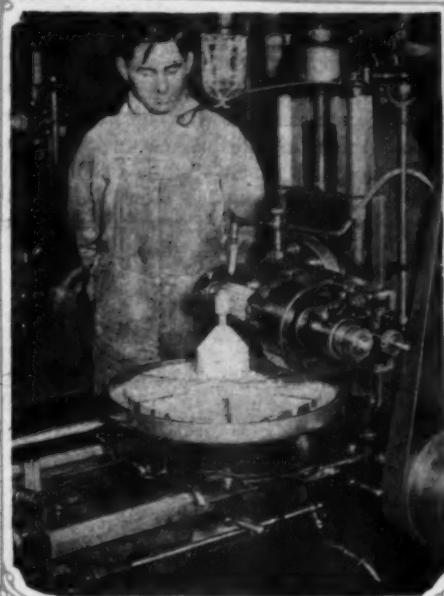
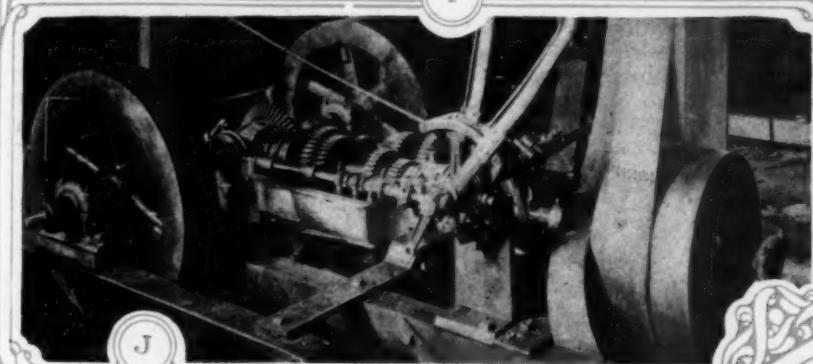
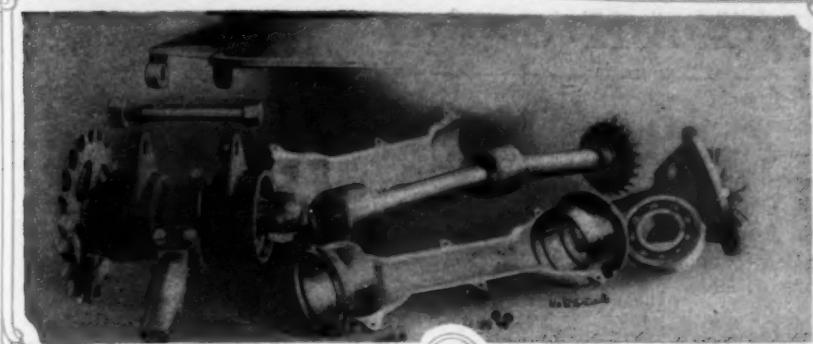
C—Showing sprockets being cut on a Gould & Eberhardt automatic gear cutter. This is another example from the Woods plant, and indicates the method by which a gang of sprockets are cut simultaneously.

D—This is another example from the Woods plant, and illustrates a La Pointe broacher, which is used in many shops for broaching square holes in gears, sprockets, and other transmission parts.

E—Excelsior motor in the process of having the half-time gears assembled.

FOURS AND SIXES IN STEVENS-DURYEAS LIST

These well-known advocates of the three-point suspension as a sure cure for all automobile ills will turn out just two models in four cylinders and two in six cylinders. These are Models XXX and X, fours, and Models AA and Y, sixes. The first has a 4 3-4-in. bore but a short stroke of only 4 1-2. The same engine is used in Model X, also. This has the cylinders cast in pairs, as do also the larger engines. On Model XXX, the wheelbase is 109 in. and on Model X it is 124 in. The former, called a 36.1 horsepower unit, is regularly equipped with a three-passenger body, and in that form sells at \$2,850. The same price covers Model X, which is had with a five-passenger touring body. Large wheels are used on both, in fact, on all models, those on the two larger types being 36 by 4 1-2 in. all around on Model AA, and 36 by 4 front and 36 by 5 rear on Model Y. The last is powered with a six-cylinder engine 4 3-4 by 4 1-2, rated at 54.1 horsepower, and has a 142-in. wheelbase for a seven-passenger touring body, in which shape it sells at \$4,000. The only other model not described is AA, which has a six-cylinder engine with a bore of 4 1-4 in. and a stroke of 4 3-4 in., the only engine built by this firm not having a "short" stroke. This is rated at 43.8 horsepower, and the chassis when fitted with a five-passenger body sells at \$3,300. It has a 128-in. wheelbase. On all models engine bearings are plain, transmission bearings ball, while axles run on balls also. All four models have a progressive gear box giving three forward speeds, this form of a gear having been used by this company continuously. The driving shaft of these cars presents much of worth, in that it is a continuous series of tapered squares and squared holes.



F—Hill Clark hobbing machine working on half-time gears as used on Excelsior motors.

G—A battery of gear cutters at work in the Rambler plant. In addition to the tools shown the Rambler plant is fitted out to handle the entire situation from the drop forging of the gear blanks to the gashing, planing, hardening, etc., the equipment being the most modern in all respects, including special measuring instruments which enable the inspectors to come close to the mark.

H—In the Premier plant, showing a special splining tool which is used for fashioning keyways.

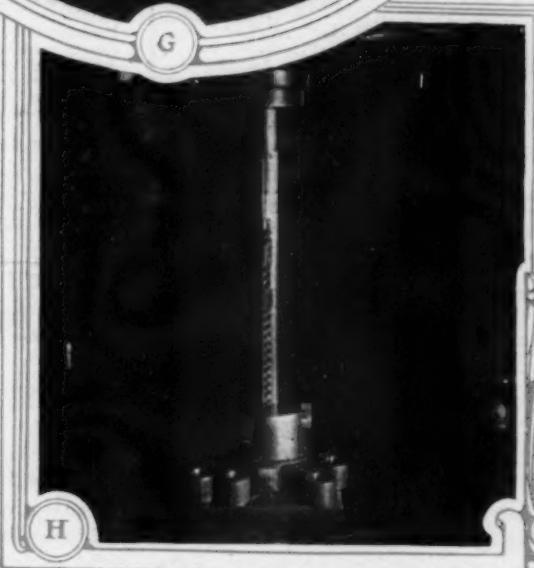
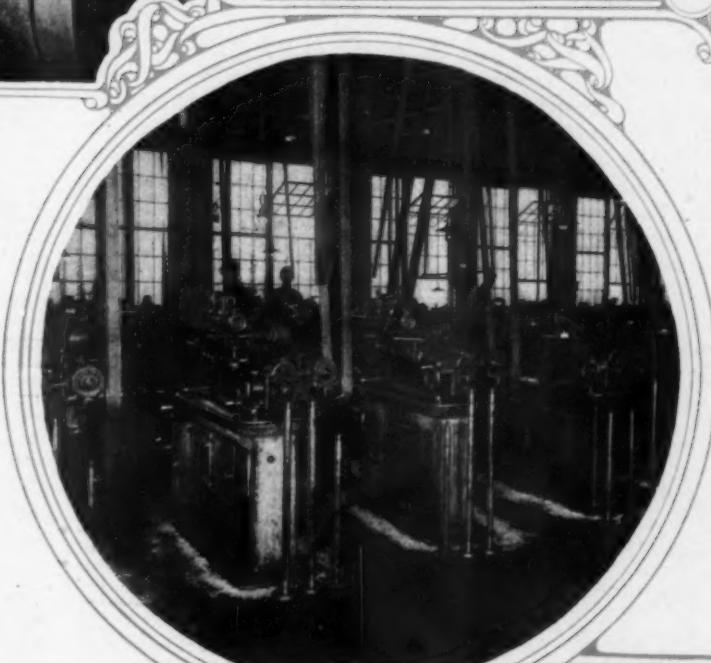
I—Woods Electric transmission system, showing differential gears, one of the two sprocket pinions, tumbleshaft, and universal joints.

J—In the Thomas works, testing a transmission gear set on a special machine which was devised for the purpose of loading the gears to the maximum safe limit, permitting of the adjustment for the purpose of eliminating noise.

WARREN-DETROIT IS MADE IN TWO TYPES

Model 10-A is a roadster, and Model 10-B is a demi-tonneau. Excepting as to body work, tires and weight, both models will answer to common specifications. The weights, as given by the maker, are 2,000 and 2,100 pounds for the roadster and demi-tonneau respectively. The motor is rated at 26 horsepower, is a 4-cylinder, 4-cycle, water-cooled (*en bloc*) type with a bore of 4 in. and a stroke of 4 1-2 in. A vertical tube radiator is used in the cooling system and a centrifugal pump for water circulation. Ignition is by a Volta magneto, assisted by a battery and coil. In the lubrication system a self-contained pump is utilized and auxiliary splash aids in the process. A cone clutch takes the torsion of the motor and hands it to a unit three-speed (and reverse) selective sliding-gear system located just back of the motor. The drive is continued through a shaft with a single universal joint. The live rear axle is fitted with roller bearings and 32 by 3 1-2-in. pneumatic tires are used on all four wheels. The wheelbase is 110 in., tread is 56 in. and a channel section frame is the foundation for the body work. Excepting for the anti-friction bearings which take the work at all points of greatest friction, the remaining journals revolve in Parson's white metal; this metal is also used in crankshaft brasses.

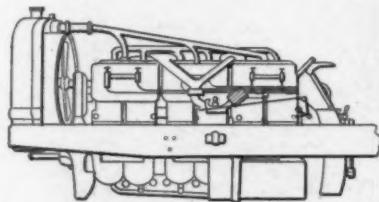
It will be noticed in the detailed specifications of this car, as in the case of many other newcomers, that the features adopted are much alike. Thus, this car has a block motor, a comparatively long stroke, and self-contained lubrication. All these are featured which have been much discussed in the last year, the discussion ending with their final and universal adoption, as proof of their inherent worth.



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WHITE LIST EQUALLY DIVIDED--STEAM AND GASOLINE

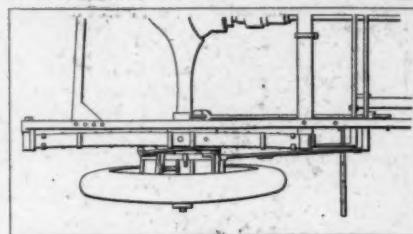
In addition to the well-known White steamer, which is made in two models, this firm will this year make two models of gasoline cars, all four of which will be exhibited at the Chicago Show. The steamers are called O-O and M-M, while the gasoline cars will bear the alphabetical designations of G-A and G-B. The steamers are respectively a five-passenger touring model of two



View of the Winton six-cylinder, 48 horsepower motor from the left shows the position of the carburetor and the Y-shaped pipes leading therefrom across the cylinder heads to the inlet manifold on the right-hand side. The piping shown, leading to check valves on each cylinder, is for the compressed air starting device, an exclusive Winton feature which allows the crank to be carried in the tool box.

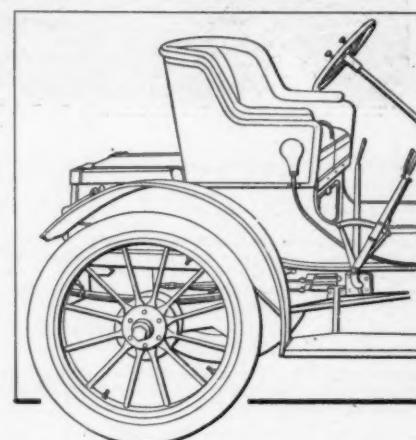
compound cylinders, double acting, and sized 2 1-2 and 4 1-4 by 3-in. stroke, and a seven-passenger, two-cylinder, double-acting compound of 3 and 5-in. bore by 4 1-2-in. stroke. The former rates at 20 horsepower and the latter at 40. Both models use the Joy type of valve gear, both have the engine located in front under the bonnet, and both utilize a flash boiler in connection with a condenser. Both models agree on the transmission, which is of the sliding type with two forward speeds, driving the rear axle by shaft, the latter having two universal joints. Engine, transmission and axles all turn on ball bearings. Turning now to the gasoline cars, these are alike with the exception of the wheelbase and the body, as well as the price. G-A has a 110-in. wheelbase and a five-passenger touring body to sell at \$2,000, while

Unusual form of platform spring suspension used on the Pullman. From the external appearance of the car no one would suspect the existence of the platform spring, which is at the forward ends of the side springs, instead of at their rear ends. This makes a very neat construction.



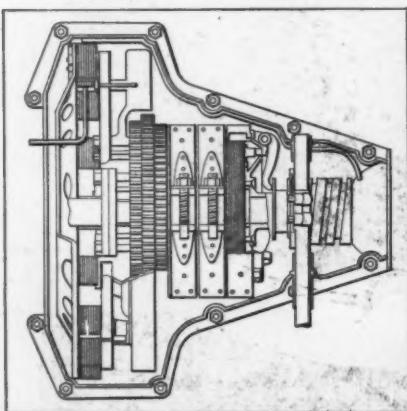
Show, are known as Models 48 and 60, after the rated power of their engines. Except for engine sizes, wheelbase and tire sizes, the two models are nearly identical, barring, of course, the slight changes in sizes of shafts, etc., necessary to take care of the additional power to be transmitted in one case. The 48 has cylinders 4 1-2 by 5, while the large car is powered with an engine of 5-in. bore and stroke, respectively. The smaller car has a wheelbase of 124 in., which becomes 130 in. on the other. Tire equipment in one case is 34 by 4 front and 34 by 4 1-2 rear,

Neat body work of the new Mora 20-horsepower runabout. The large wheels and the deep seats give a comfortable appearance, and the trunk on the rear shows that thought has been given to the passengers' comfort in other ways. The car was designed to meet the requirements of the discriminating buyer who desires a small car built on smart and up-to-date lines. Control is by the standard levers, operating internal expanding brakes on the rear wheels and a two-speed progressive sliding transmission. Spark and throttle levers are on top of the steering wheel.



with option of 36 by 4 all, and 36 by 4 1-2 all in the other. Cylinders are cast in pairs, with all valves on the right-hand side, and all enclosed. The carburetor is placed on the left, and piped across to the right side, while the magneto and centrifugal water pump are both conveniently located on this same side, the right. The crankshaft is offset, and supported by four plain bearings. As always, the crankcase is split vertically along the center line, instead of the more usual horizontal split. A feature of which the makers make much, and which is worthy of close examination, is that of the self-starting device. This consists of a collector tank, which collects and stores gas under pressure from

Planetary change-gear and flywheel magneto used on the Ford model T. The magneto has no commutator or brushes, no gearing, no contact points. The rotating member is a part of the flywheel. The coils in which the current is generated correspond to the armature of an ordinary magneto, are stationary and are enclosed in the flywheel casing. The magnets, on the other hand, are on the flywheel and revolve. The electrical principle is the same, only requiring that the magnetic lines of force be cut by the armature coils.

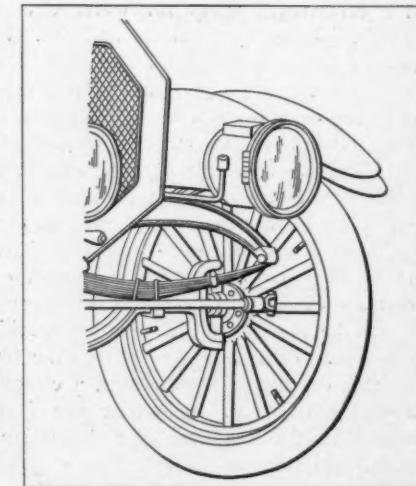


G-B has a 120-in. wheelbase and a more roomy five-passenger body, selling at \$2,500. The motor in each case is a four-cylinder unit, of 3 3-4-in. bore and a very long stroke of 5 1-8. Cylinders are cast in a block, cooling is by water, centrifugal pump circulated, ignition by Bosch magneto only, cone clutch, four-speed selective transmission rolling on ball bearings, as do also the two axles. The engine bearings, too, are ball. Other details follow standard gasoline engine practice. The power rating of this size engine is 22.5 horsepower.

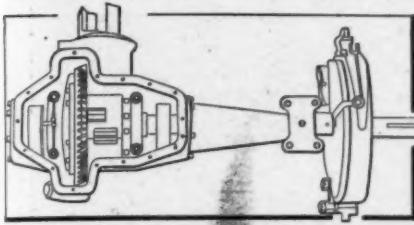
WINTON'S MODELS SIXES AND SIXES ONLY

Unless you want a six-cylinder car, you cannot have a new Winton, for the output of the Cleveland factory will be confined to a limited number of this type, in two differing powers, however. These two, both of which will be shown at the Chicago

Large wheels are becoming more and more popular, even on low-priced cars, for which it was formerly claimed that the cost of large diameter tires was prohibitive. The illustration shows a 27.2-horsepower McIntyre, which sells for \$1,250. All four wheels on this car are shod with 36 by 3 1/2 inch pneumatics. The wheels themselves are unusually robust, having sixteen spokes instead of ten or twelve. The steering knuckles are arranged to bring the center of the knuckle as near as possible above the point of contact of the wheel with the ground, to facilitate steering; this is a feature which has been much neglected of late.



THE N.Y.A.A.M. SHOW

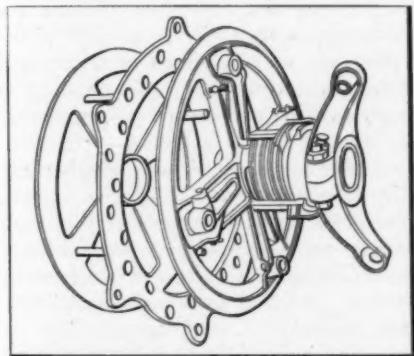


Peerless rear axle construction, showing means for allowing the camber of the rear wheels. The floating live shafts do not slip into the differential, but connect with universal joints, one on either side of the differential. Thus it is possible to incline them downwards.

cylinders one and six, during the power stroke. This is piped back to the whole six cylinders through a rotating distributor and a starting valve on the dashboard. When it is desired to start the car, pressing the starting button allows the gas access to the distributor, which permits it to flow into the cylinder, which is in the starting position. The gas drives this piston down and the engine starts with no manual effort by the driver.

MANY REFINEMENTS MUST BE LOOKED FOR

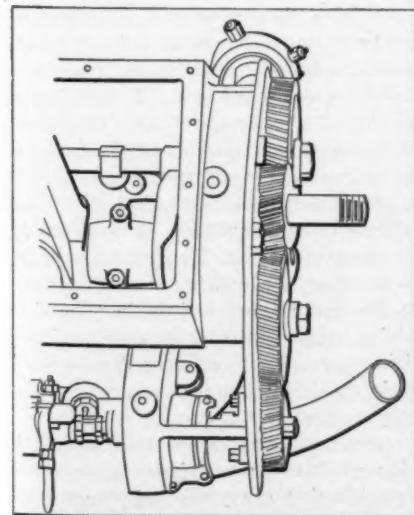
Curiosity, while it is at the bottom of many discoveries, will be beset by difficulties in its migration through the automobiles of the year, before it will be in a position to measure up



Three-plate clutch used by the Midland. The middle disc does the driving; it is mounted on studs on the rear edge of the flywheel, being made of phosphor bronze and fitted with cork inserts. The other two discs are of steel, floating on roller bearings on an extension of the crankshaft. They are forced into engagement with the central discs by spring pressure, applied by the medium of toggle levers. The clutch is easily adjustable and is smooth in action.

divers of the refinements which actually do obtain and which are important to the well-being of the designer, the maker, and the ultimate consumer or user.

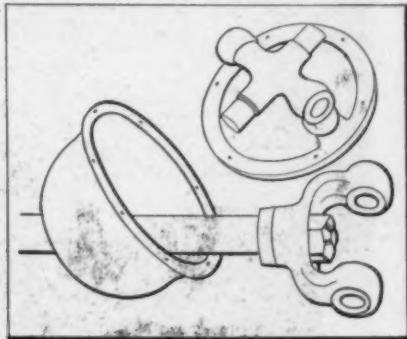
Metallurgy, while it has done much for all industries in which steel plays an important part, was a sleeping giant before the coming of the automobile, and four or five years ago the engineers who struggled with the rickety machines which then passed currency for cars, were much perturbed when the parts after being laboriously processed, went asunder within a hundred



View from beneath of the forward portion of the Inter-State crankcase with the lower cover removed, showing the spiral timing gears. The crankshaft actuates the camshaft on one side, from which the timer shaft is in turn driven by bevel gears; on the other side the crankshaft drives the pump and magneto, which are both on the same shaft, through the medium of an idler pinion. The spiral gears are cut with little more difficulty than the ordinary spur type, and are noiseless in operation, owing to the sliding nature of the contact of their teeth. In a construction such as this they balance their own end thrust and so require no special bearing construction.

miles from home. In the haunts of steel, when the question of the kinetic qualities of materials was broached, the bare-faced vendors declined absolutely to consider any further increase in quality unless as a matter of petty routine, under which conditions, should there be a sufficient incentive, a more

One end of the propeller shaft of the Palmer-Singer, showing the cross type of universal joint and its cover. The yoke on shaft end, the cross, the back plate, and the back plate studs which are shown holding the cross are all steel drop-forgings, the material being a chrome nickel alloy. This type of axle is ordinarily believed to require the services of a radius rod or rods and a torsion rod, which are in this case provided with much care.

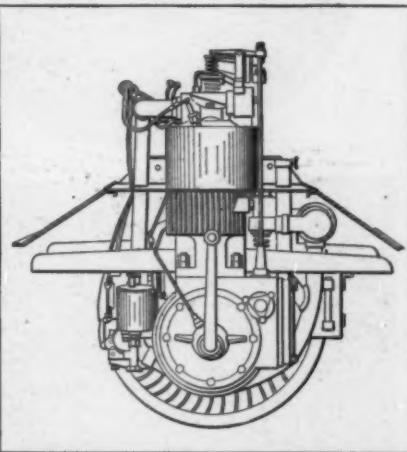


promising product might be delivered, but it was pretty generally understood that there was to be no question about the additional price, the addition being very considerable.

Automobile engineers, not being satisfied with the life, considering service, of the materials which they were able to procure, delved deep into the lore of the subject, worked long and faithfully in the laboratory, argued the points with the fabricators of steel, and convinced them in the long run that what they were furnishing was as junk in comparison with the character of steel which would have to be put into automobiles, in order that they would operate sufficiently long to pay for oats.

Makers of cars are now in a position to get everything they require by way of steel, at prices which are consistent with quality, and the facilities available for fashioning parts are on a plane which is beyond the dream of the most advanced forge

Novel air-cooling system brought out by the Franklin, to insure equal cooling of each cylinder. The view shows the front end of the motor, with a section through the sheet metal hood which encloses all of the motor except the tops of the cylinders. The cylinders are shown with their sheet-metal jackets on the portions projecting above the hood; beneath this the cooling flanges, which run longitudinally, are visible. The regular Franklin concentric valves, which are continued for this year, may be discerned in the cylinder heads, and at the back is the suction-fan flywheel of a familiar type.



masters of even two or three years ago. One of the process illustrations, as given in this edition, shows a one hundred ton press, cold pressing a side bar of the most intricate shape, using alloy steel, and the operation is completed within a few minutes time, whereas in some of the earlier productions of side bars for cars, it took seven men with beatles and clamps nearly five hours to produce a single frame.

There is more in quality than will be found in the raw material which may be delivered at a plant. If the process demands several reheatings of the steel, each one of the operations offers dangers, and the chances are, even with men of the greatest skill, that a goodly percentage of the whole will be damaged beyond repair, under such conditions. If a side bar

PLATE VIII.

MACHINE METHODS
OF UPHOLSTERING

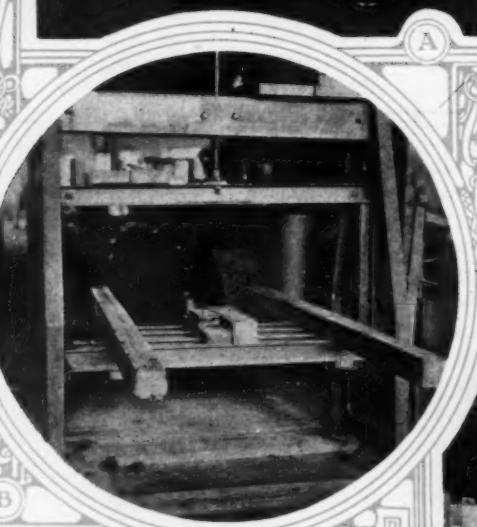
A—Preparing the work for the press, which requires the adjustment of the holes in the material to match up.

B—Is a view of the press, which will be observed in operation in view D.

C—Shows the upholstered back and sides of a Woods Electric.

D—In the press in operation with the cushion being formed between the top and follow board.

E—Upholstering department in the Pierce-Arrow plant, showing disposition of men, stock and work.



can be raised to a definite temperature in a furnace suitably contrived, and if a pyrometer tells just what the temperature is, danger will be a remote contingency if only the press is large enough, and the entire operation can be performed without any reheating at all.

True, when a part is finished, either by pressing or in the forge, it is necessary to correct the structure, which is a matter of annealing under simple conditions, heating, quenching, and

tempering under other conditions, varying the operations to suit the qualities of the materials employed and the work to be done. The plants of to-day include these facilities, they are on a basis of certainty, and they are definitely contrived for the very work which has to be performed, so that the results are equally definite, and compromise measures receive but scant, if any consideration.

Castings are now reduced to their legitimate zone of activity; they are no longer used as a substitute for forgings merely because casting methods are lower in point of first cost. This question of overhead charges is reduced to the infinitesimal increment when a large number of automobiles are built under a single roof, and the mere fact that patterns in wood may be cheaper than dies in steel, does not have to be taken into account. These castings, as they are used in the automobiles of the present time, are reduced to the level as follows:

(A) Gray iron for cylinders, pistons, crankcases, flywheels, and gearcases.

(B) Aluminum for crankcases, gearcases, and control housings.

(C) Steel castings for brackets, brake drums, clutch members, etc.

Cylinder castings, while it is admitted that they were parts which gave serious difficulties for several years, are now so readily made in many foundries, that, with just a little care, there is almost no reason why defective castings should be found in any motor. In some of the finer examples of cylinder work, castings partake of the characteristics which are not uncommon to semi-steel, and the grain is so close that under hydrostatic test of 500 pounds per square inch "spraying" is an unlooked-for contingency. This is a condition which is very different from some of the former practices, in which if a hydrostatic test was the venture none had the hardihood to

extend it beyond 100 pounds per square inch as the absolute limit, and if some of the foundries were able to enforce their way at that time, it is almost certain that they would have preferred to eliminate the hydrostatic test.

This year many of the makers of cars, having tried out both aluminum and gray iron for crank and transmission cases, have evidently reached the conclusion that gray iron, all things considered, is the preferable metal to employ. There is no gain-



I

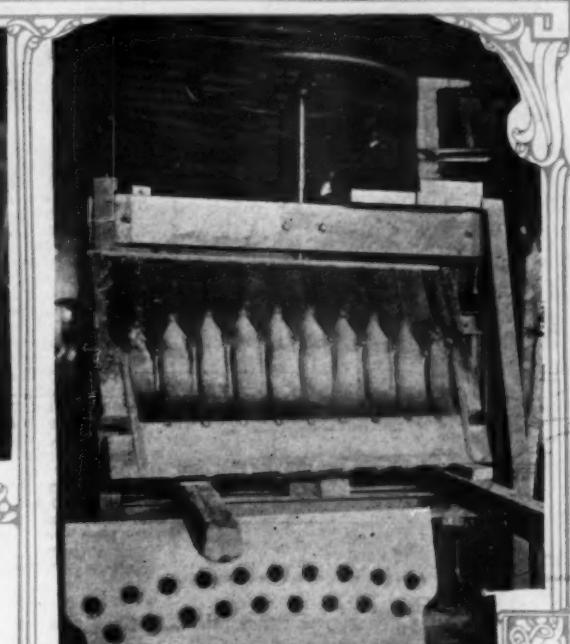
F—How the work looks on the side opposite to that shown in view E.

G—Picker in the process of preparing the hair before it is definitely weighed out for use in the cushions, backs and sides.

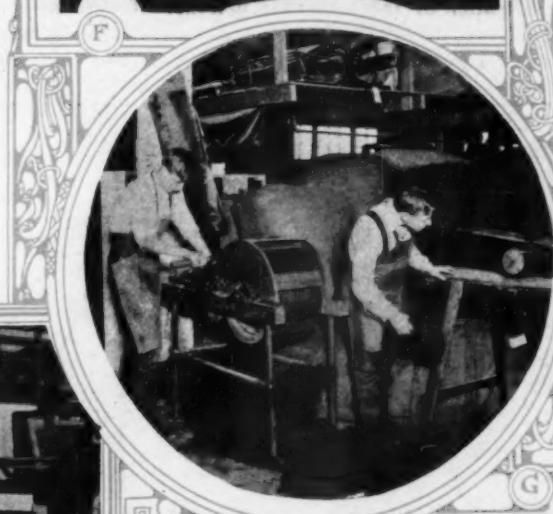
H—An intermediate condition in the tufting process.

I—Creasing the leather which is placed over a form, and the operator with a special tool traces the configuration in the manner as shown.

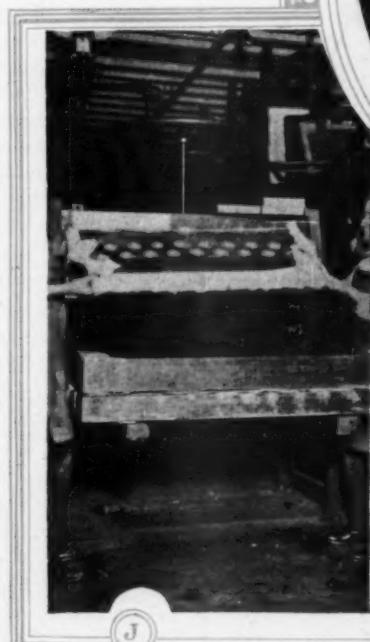
J—After the hair is in place, and before the follow board is adjusted in position.



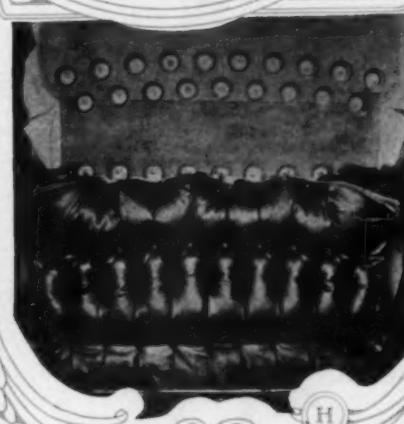
F



G



J



H

saying the fact that the gray iron is considerably heavier than the aluminum, but it is also a certainty to proclaim that it is as much stronger as it is heavier, hence the designer, if he takes advantage of his opportunity may realize a distinct advantage by employing the gray iron in many of the examples, at any rate. That this change is one of the distinct characteristics of the year, and that it has been carried to unusual length is a matter which will be readily ascertained by closely inspecting the automobiles as they will appear in the National Show.

Crankshaft work is now not only good, but the price has been sufficiently reduced by perfecting the process, so that the "toughhard" crankshafts in alloy steel do not now have to be slabbed out, and that there is a gain in favor of drop forgings, is one of the points to be made. Likewise, when reference is made to camshafts, they will stand the light of critical inspection, and it will be found that they are much improved in many ways. The new method of grinding the hardened camshafts, takes into account the presence of integral cams, and in addition to the great accuracy which is obtained, speed is so much increased that there is almost no difference in the time required between grinding a shaft when the process is impeded by the presence of cams, and grinding a round shaft of the same length.

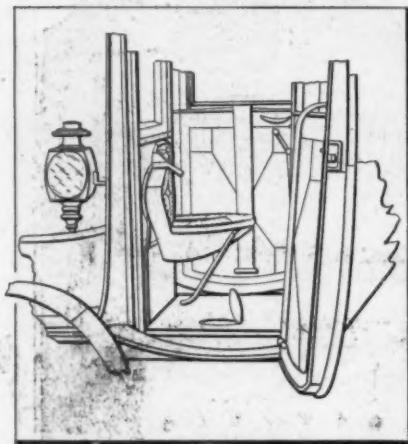
Grinding processes have been brought into the greatest prominence, primarily, because some of the materials now used are so nearly glass-hard that they beat the cutters of ordinary characteristics, and are only managed when resort is had to high tungsten steel for the cutters, provided the work is carefully annealed. It is undoubtedly advantageous to be able to use the harder grade of steel; its kinetic qualities are on a superior basis, and the grinder is so thoroughly capable, that if there is any difference at all, it works the better if the steel is relatively hard.

Noise, which once was looked upon as a necessary evil, is entirely absent in many cars, and as the merest suspicion in a very few. The quality of an automobile is measured to-day partly by its road work, but to a very considerable extent by its noiseless performance. Autoists instinctively reach the conclusion that beyond its disagreeable aspect, it represents undue wear, and instinct, in this case, seems to be as near right as

anything can be. Noise, if it represents anything, is due to vibration, and metallurgists have long ago reached the conclusion that the life of steel oozes out in direct proportion to the vibrations, considering given fiber strain, so that the absence of noise, unless it is due to a muffling process, counts the favorable condition which comes from aborting vibration.

To some extent, noise is muffled, and it is very likely that this muffling process is one which is favorable to the life of the

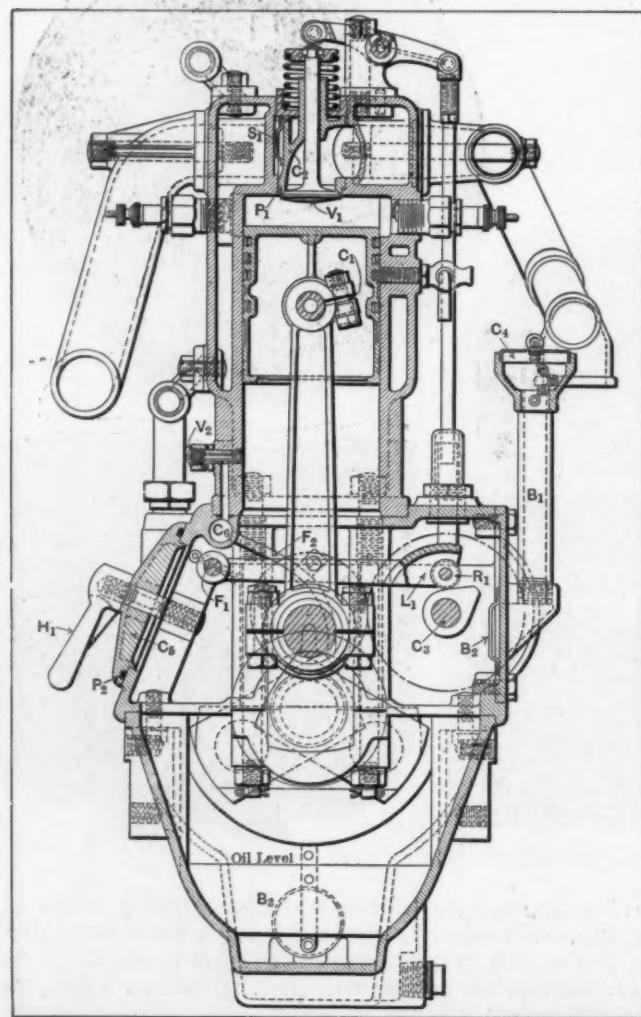
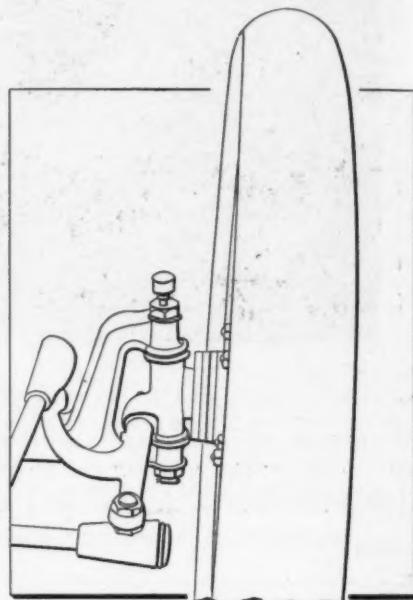
THE N.Y.A.M. SHOW.



View of the interior of a Rauch and Lang electric coupé, showing the small folding seat in the front, which may be utilized in an emergency. This is not a skimped seat, but of full width and depth. The car is essentially one for but two or three people, whichever the rear seat will accommodate, but it is often necessary to carry another. In just such an emergency the little refinements like this, found only on the best cars, are appreciated at their full worth. Not only are the enclosed cars the source of much thought, but equally as much gray matter is expended upon the victoria, brougham, and other open cars.

parts. Meshing gears, for illustration, if they run on the pitch line, are accurately cut, and properly lubricated, will be quite noiseless in their performance. To some extent, this noiselessness may be traced to the muffling effect of the housings which enclose the gears, and in the same way, the motors are muffled. As a matter of fact, the near presence of a suitably contrived bonnet over the power plant adds its quota in the noise-killing process, particularly if shaped with this idea in view.

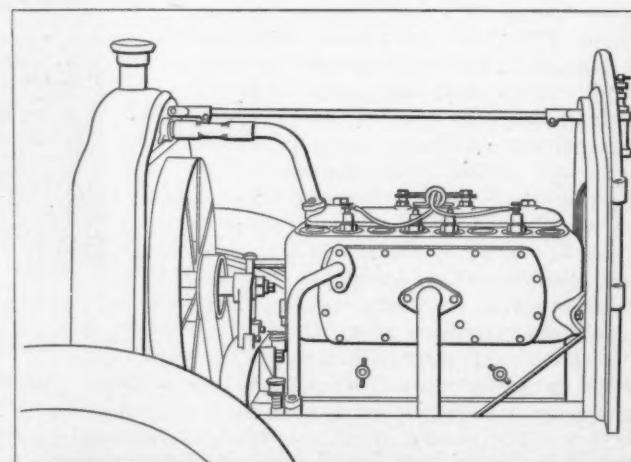
Steering pivot, connecting link, and end of cross connecting rod on the Pope-Hartford car. On this car the steering is strictly irreversible, of the worm and sector type, enclosed in a dust proof case and fitted with a 17-inch mahogany steering wheel. The steering joints are provided with spring buffers to relieve road shocks. Steering cross rods and connections are located behind the axle and are thus protected from road obstructions. The front end of the fore and aft rod is, in 1910, located above the axle, instead of underneath as formerly. The rear end is also raised, giving about three inches more clearance than on previous models. The steering column is arranged on an angle which makes the driver's position a most comfortable one. The road wheels, too, have the customary gather.



Section through the engine of the Anhut car, which motor is a Brownell product, made in Rochester, N. Y. The overhead valves will be noticed as well as the operating mechanism for them. Below is seen the extension of the crankcase, which forms the oil well.

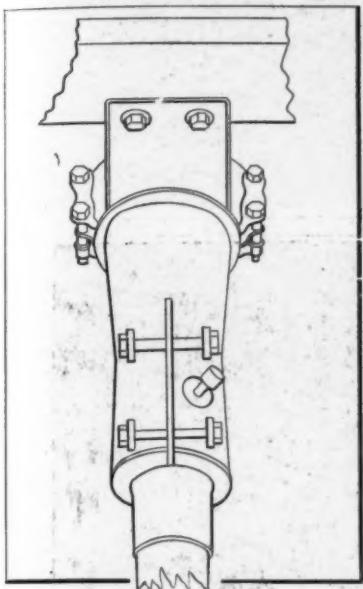
It has always been especially difficult to so design the half-time gears of a motor as to eliminate noise. The cars this year seem to be well in hand in this respect. In some cases, the gears are shrouded, in others, they are of the helical cut, and in a few instances the webs are leaded. In one car (the Brush runabout) the motor is of the vertical single cylinder type, and in order to eliminate secondary vibrations, a balanced gear meshes with a pinion on the crankshaft, and a relation of the balancing weight is so established that the motor is permitted to operate at a sufficiently high speed to deliver its maximum power without showing anything of the vibration which would follow under the conventional conditions of design.

Ignition is now by magneto for the regular work in almost every automobile, and while the high-tension system obtains in the majority of cases, the fact remains that low-tension types of magnetos are employed in certain well-known makes of cars. It has always been self-evident to autoists of skill that the low-tension system is thoroughly efficient, delivers a spark with maximum energy, and is free from possible high-tension troubles, with a further advantage that the wiring system, especially those parts of it which are near the motor, is reduced to the absolute limit of simplicity, and ready removability.



View of the engine and forward part of the chassis of the White new gasoline car. This block motor has a very long stroke, while as the cut shows, the piping for exhaust, and both water inlet and outlet is reduced to an absolute minimum.

'THE' N.A.A.M. SHOW'



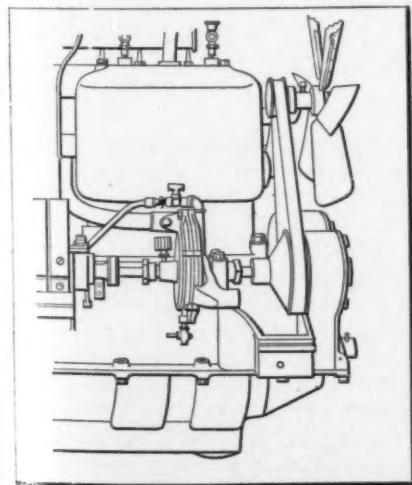
This illustration shows the terminal of a torsion tube of a Fal car, and as will be observed, the terminal is universal in its action, of great strength, presents an adequate bearing surface, and is anchored to a substantial crossbar of the chassis frame. The torsion tube extends out from the terminal, and is bolted into intimate relation. The propeller shaft, which is enclosed, is centered on Hyatt roller bearings, is large for the work considering the character of the material used, which is selected for torsional ability. The universal action of the joint is assured by the spherical shape of the ring, which is closely fitted in a case, and the bolting to the cross member is secure. The propeller shaft is long, it is practically horizontal, and when the automobile is carrying its full complement of passengers, it is designed to afford all the advantages of a straight line drive. The transmission gear is selective.

The besetting sin of the low-tension system lies in the mechanical difficulties which will confront the novice, or the half-baked artisan who fails to take into account the terrific speed with which the hammer is required to attack the anvil, and these low-tension systems, by virtue of this mechanical demand, are necessarily confined to the shops which are capable of doing this class of work. Among the cars which hold to this method are the Premier, Locomobile, Columbia, Gaeth, and others.

The fuel problem has been much simplified, largely because carburetors now conform to the plain requirements, and many of the auxiliary attachments which were once considered essential to success are being eliminated on the ground that while they may have been of some use, they were very troublesome by way of befogging the notions of the autoists whose mechanical inclination was severely limited.

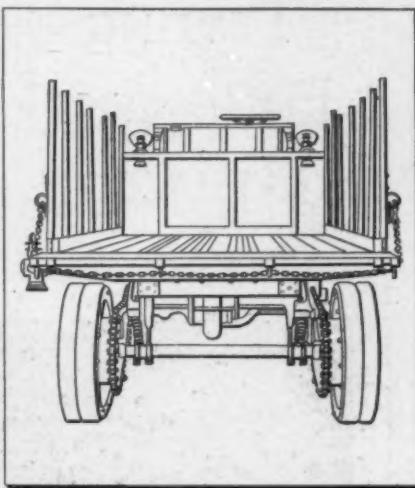
Simplicity is present to a marked extent, all through the cars of the year, and accessibility, which was once a dream, now reaches the point where there is little to complain of.

While the low-tension systems of ignition hold their own with more or less tenacity, the fact remains that high-tension jump-spark systems are used in the majority of new cars. This high-tension work includes a magneto in almost every case, with the understanding that batteries and coils are employed in an auxiliary capacity. Uni-sparkers and other like means are frequently introduced as the main method of sparking, with the

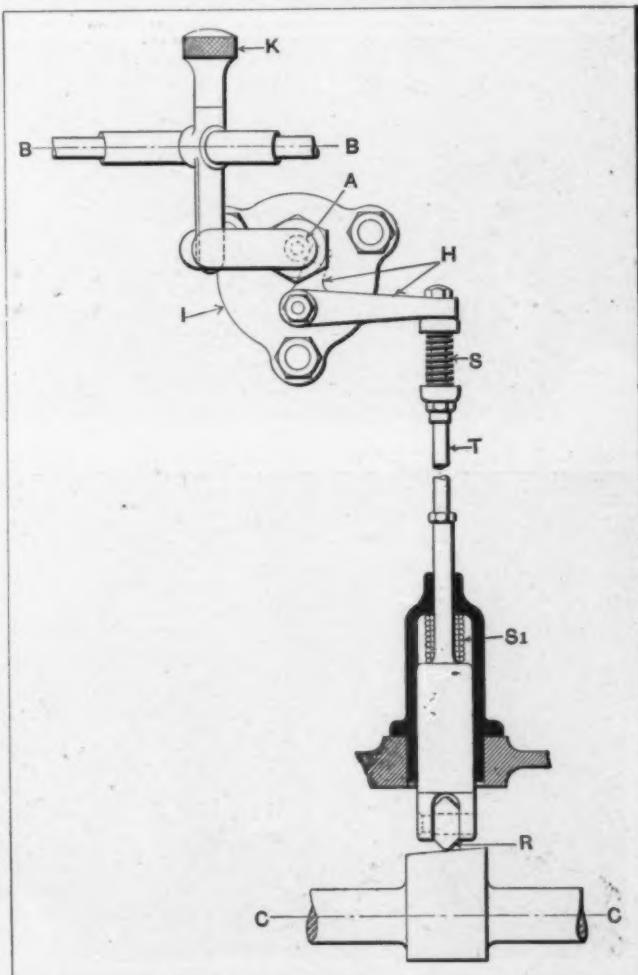


This illustration is of the front end of the Selden motor, showing the manner in which the half-time gears are enclosed, the drive for the fan, and location of the water pump and magneto. The evidence afforded is in favor of compactness, and accessibility is one of the strong points which the company makes for this motor. The motor is rated at 36 horsepower, is of the four-cylinder, water-cooled type, works four-cycle, and ignition is on an efficient basis (see table). The cylinders are cast in pairs, are 4 3/4 x 5 inches bore and stroke, respectively, and the character of the workmanship which is put on the motor is high.

In the Knox exhibit, while the pleasure cars will attract a wide measure of notice, it is believed that the question of commercials is now forging to the front, and the illustration here offered is of a Knox truck looking at it from the rear. This is Model 18, is rated at five tons, and the character of the workmanship is that which is characterized as fitting for this class of service. The rear traction wheels are fitted with dual solid tires. The front wheels are fitted with single solid tires and the record this truck is making is sustaining the Knox reputation in a manner highly satisfactory to the maker.



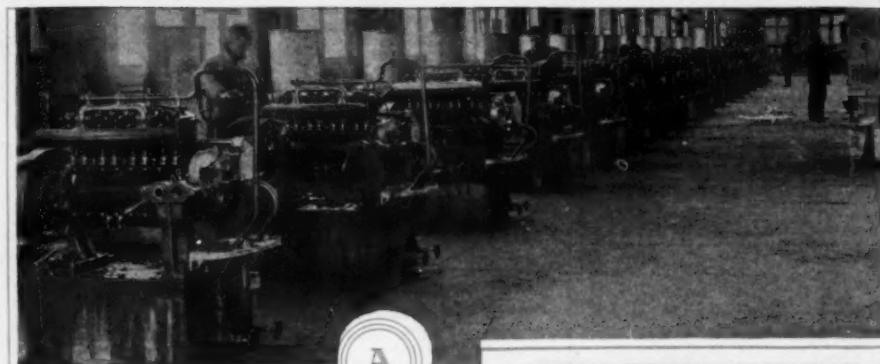
understanding that the owner of the car in such cases may have a magneto as well paying the difference. In modern coils, the energy component is on a much more substantial basis than heretofore, and the economy with which the battery energy is utilized is on a fitting basis. It is also true that storage batteries as they are now made for sparking service, are free from the old sulphating troubles, and serve extremely well for the purpose. Dry batteries, in view of their considerable capacity, low



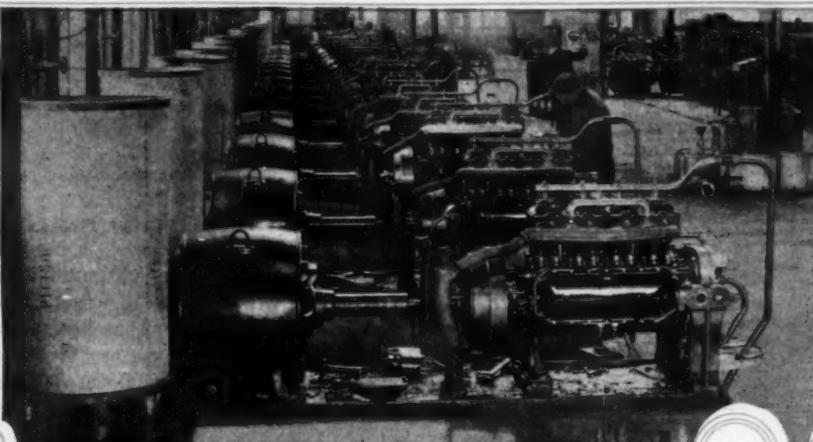
Mechanism as used on Locomobile low-tension ignition systems with a sliding cam to manipulate in adjusting the spark advance.

PLATE IX.

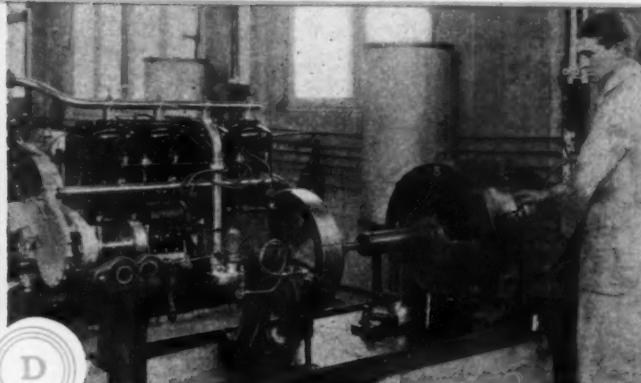
TESTING
EQUIPMENT
UTILIZED



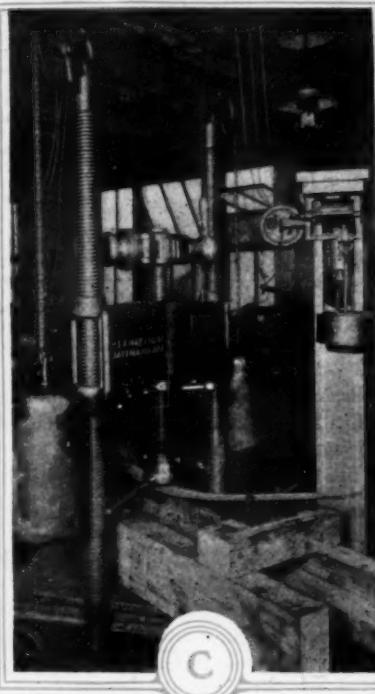
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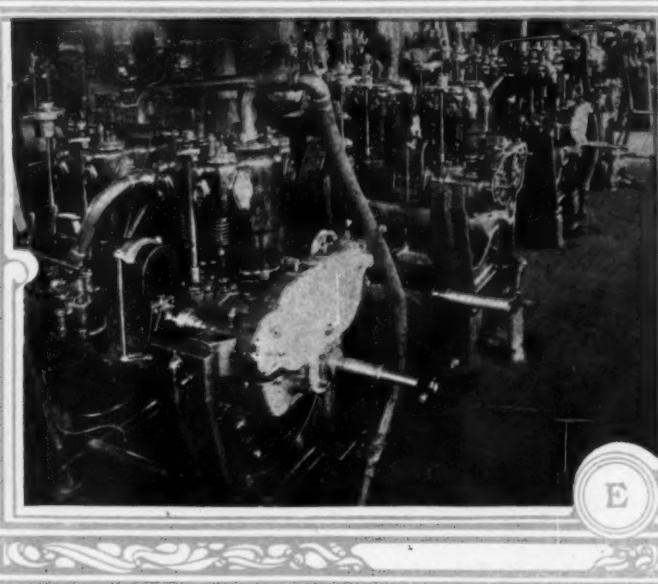
B



D



C



E

A—A row of motors undergoing test in the Rambler plant utilizing the new system by means of which half of the motors are driving dynamos which furnishes current to electric motors to drive the other half of the motors undergoing test on a "run-in" basis.

B—Another view of the Rambler testing equipment showing the electric motors, one for each testing block, and the tanks to the left which are placed to hold the cooling water. This view gives some idea of the vastness of the modern automobile manufacturing plant, and the problems which must be coped with. The testing room, of course, receives all of the motors at one time or another, and hence, equal provision must be made here for handling large numbers, else the motors will be poorly and insufficiently tested and run in.

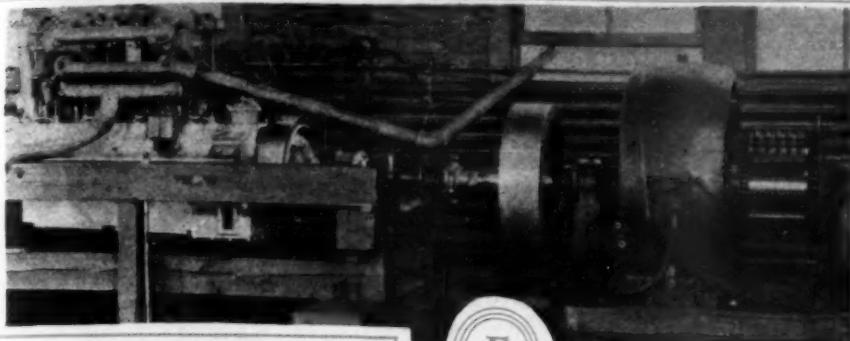
C—A static testing machine used in the Woods plant for testing the ability of flat steel as used in springs and like work.

D—In the Rambler plant showing a test block with the motor to be tested removed, disclosing the tumbler shaft which connects the motor to be tested with the electric motor which is utilized in connection therewith.

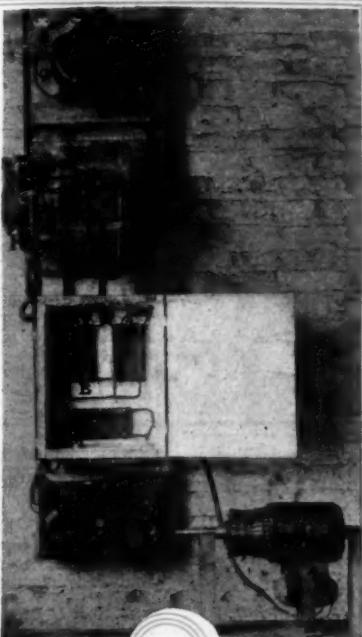
E—A view of the test room in the Premier plant showing a line of motors undergoing adjustment. Modern testing equipment provides not alone for the testing of the motor but the trying out of many other parts which enter into the complete chassis.

internal resistance, and a continued life without depreciation, are finding favor as the auxiliary means of supplying energy, and this is especially true when the battery box is provided with a system of terminals which will work without jarring loose, and in which the resistance of joints is at a minimum.

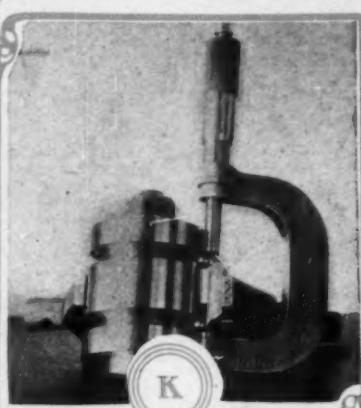
The question of standardization is now approaching a point where it can be seriously discussed with some expectation that the day will not be far off when an autoist will find it possible to take the wheel of any automobile and not have to learn how to manipulate the foot pedals, and sliding-gear mechanism. There must be some one right way of placing the sliding-gear mechanism so that it will serve every end, and it will be of the greatest advantage, broadly speaking, if drivers can learn once



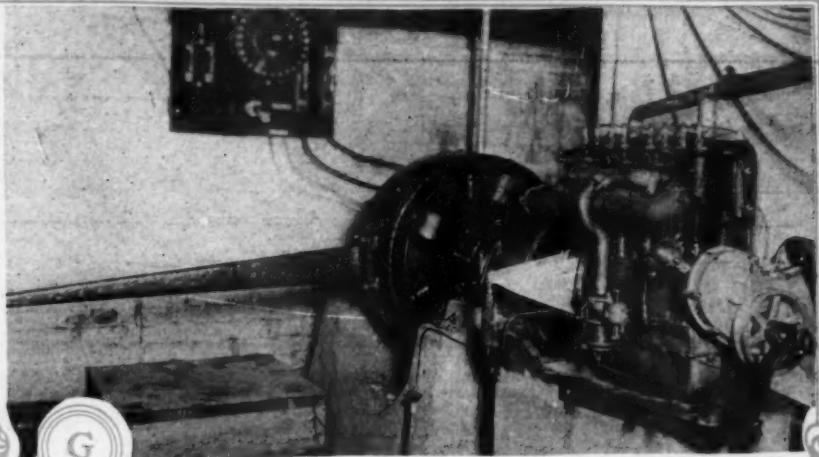
F



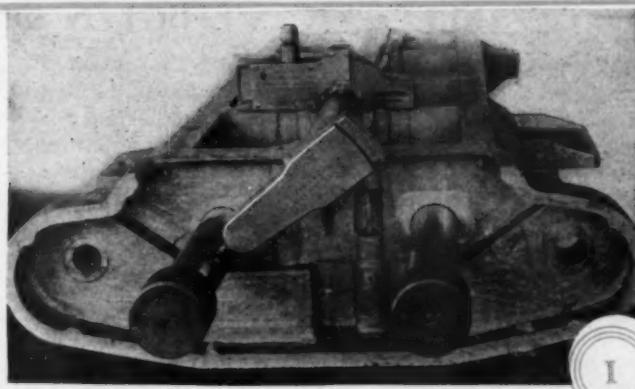
H



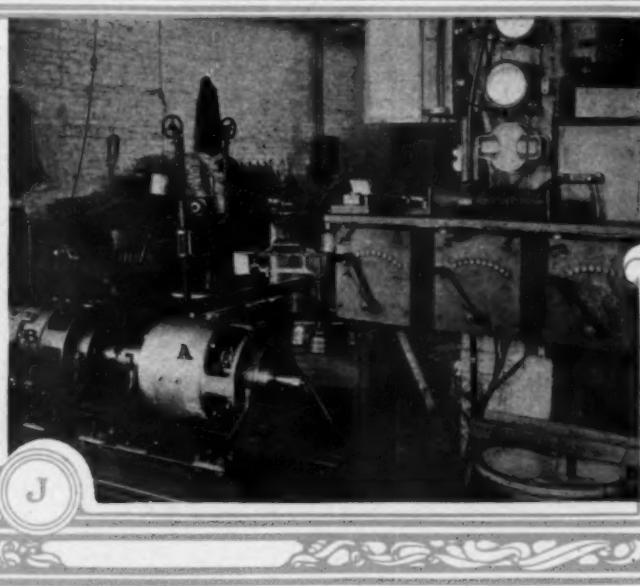
K



G



I



J

F—An electric dynamometer as used in the Alden-Sampson plant for ascertaining the power, flexibility and endurance of truck motors of the company's design.

G—Electric dynamometer as used in the Inter-State plant, comprising an electrical machine with cradled fields and a lever arm which connects with platform scales. An Inter-State motor is shown on an adjacent platform ready to be tested.

H—Electrical testing machine in the Woods plant, comprising a step-down transformer, suitable switches, volt and ampere meters, and a test block on which the armature B is placed, and by induction if any one coil in the armature is defective as to insulation, sufficient heat will be generated to cause the insulation thereof to smoke, thus disclosing to the tester the particular defective coil.

I—An instrument for ascertaining centers of the half time gear shaft in relation to the crank shaft of Thomas motors, the same consisting of a dummy shaft in place of the crank shaft, dummy shafts in place of the cam shafts and a rotating pointer which contacts with the secondary shafts equally if the work is true.

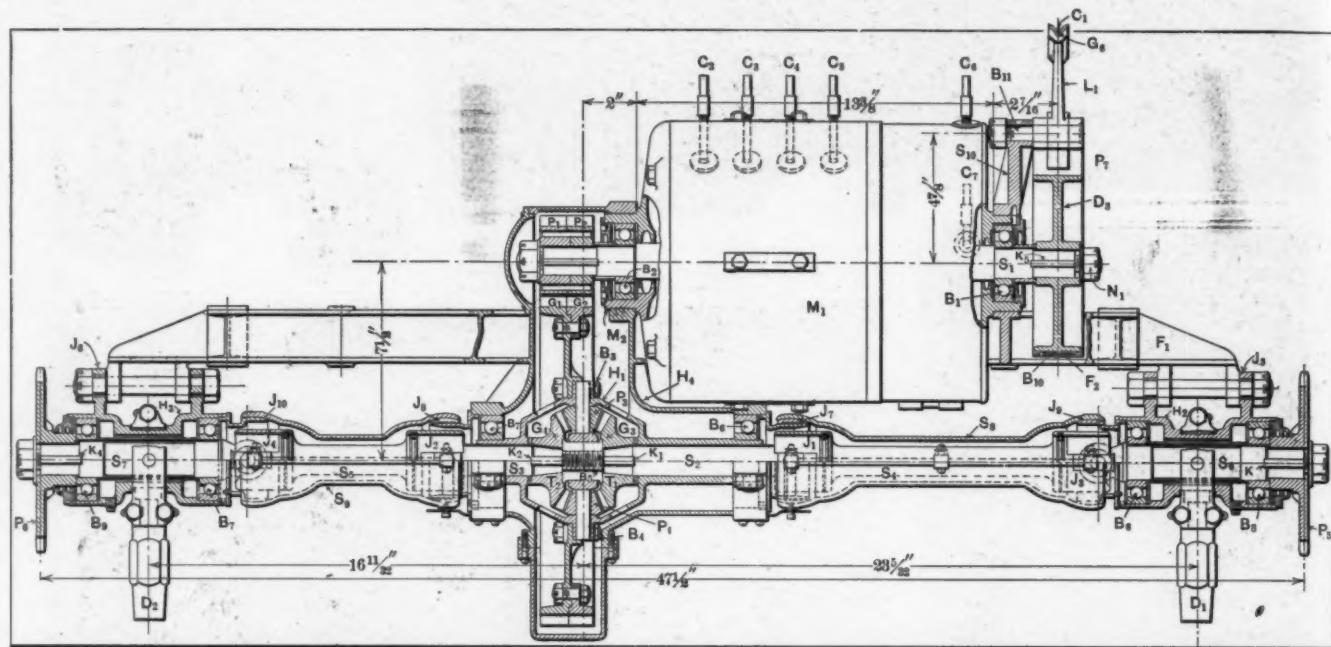
J—Testing equipment of an electrical character used in the Woods plant for determining as to the efficiency, temperature increase, commutation and endurance of motors used in Woods Electrics.

K—Measuring the center distances of the inner races of a dual ball bearing.

for all the nature of the requirement, and thereafter as a matter of habit, run a car without the dangers which are invariably present when there are no two cars alike. Skill, when it is analyzed, simmers down to the level of habit.

There are many other details in relation to automobiles which can well be reduced to a standard, and the quality, taking it as a whole, which will finally obtain, will be much higher under standard conditions, than it can be during all the period when minds disagree. It is possible to seriously consider that all the men who disagree as to the best method of performing a given test, will be more nearly right in their respective undertakings when each one of them diverges a little from the path which to him looks the most promising.

THE N.Y.A.A.M. SHOW



Working drawing in partial cross-section of the motor, reduction and countershaft unit of the Woods electric, showing a neat and unusual feature of design. The central case containing the differential gear is connected to the sprockets on each side by doubly-jointed shafts, preventing any possibility of binding through mis-alignment or distortion of the frame by strain from hard usage. The reduction gears are of the herringbone type, and annular ball bearings are used throughout.

ELECTRIC VEHICLES ON PARADE AT CHICAGO

INTEREST to an extent as never before centers in the electric vehicle situation, primarily, on account of the excellent service this type of vehicle has ever been capable of, and then, in view of the improvements wrought in batteries in recent times, and the many mechanical refinements which have crept into the cars. Electric motors were originally protected in connection with other modes of transportation as in trolley car service, and controllers of the drum type also emanated from the same source.

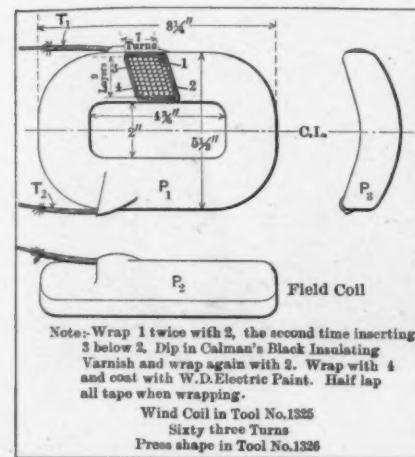
The electric motors demanded a certain amount of attention, and it took quite a little effort on the part of advanced engineers before they were as a unit on the question of the use of a single or two motors. Storage battery engineers are divided into two camps, one of which adheres to the lead type of storage battery, and the other is taken up with the Edison idea.

In the mechanical work the company offerings are diversified, as, for illustration, the Babcock Company is nailing its faith

to a worm drive; Baker electrics are shaft-driven cars; Woods motor vehicle is an excellent example of side-chain drives; Detroit electric is a double reduction silent chain type; Rausch & Lang uses a side chain; Studebaker mounts the motor on davits, and a silent chain flexible drive is the result, and the Waverley is also a silent chain proposition. Each company will tell why its preference is for the particular method it employs, but the users of electrics, and spectators in general, will testify to the excellent operating qualities of electrics in general.

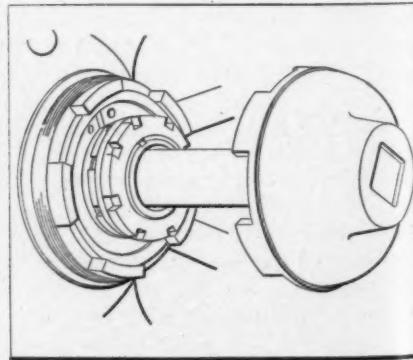
BABCOCK ELECTRIC HAS ADVANTAGE OF A WORM DRIVE

The Model No. 14, at \$2,600, is a coupé for four passengers, using an individual motor, which is rated at 5 horsepower, and suspended on the chassis frame under the body, making a straight line for the propeller shaft to the housing in the live rear axle. The battery is composed of 36 cells, each with 13 plates, divided into two halves, and placed under the hood in front and under the deck at the rear. The initial reduction in the transmission system is 3.9:1, and for the rest the control system gives five forward speeds and reverse. The chassis frame

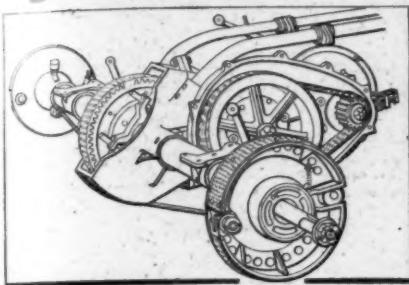


Field coil of the Woods electric, of which four are used. There are 63 turns of wire on each coil, these being wound on a form and then pressed into their final shape. Intermediate between the winding and the final pressing the coils receive four windings of insulating tape and two coats of insulating varnish and paint, to make them absolutely proof against dampness. The curving shape of the coils indicates the manner in which they are to be fitted into the frame of the motor. This is, of course, of the four-pole type, series wound, and draws its current from 49 MV Exide cells.

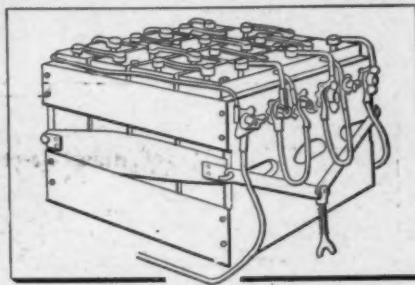
Studebaker electric uses the full floating type of rear axle, of which one of the hub ends is shown. In this drawing the floating shaft with the dog clutch on the end has been partially withdrawn from the axle, as if for removal. This reveals the five dogs on the clutch and the five sockets in the hub in which they enter to take up the drive. When the parts are in place the hub cap is screwed on over the threads. The withdrawal of the shaft reveals the bearings.



THE N.Y.A.A.M. SHOW



Power plant of Detroit electric models E, F, G, H and L. In this case the motor is mounted just in front of the rear axle, making a unit construction, while at the same time a large proportion of its weight is supported from the body by means of the radius rods. The motor is a multipolar, series wound, rated at $2\frac{1}{4}$ horsepower under normal conditions.



Section of the Babcock battery, showing how the cells are assembled. The illustration shows twelve cells assembled in a unit for installation in the car. Connections are made from cell to cell in the same row by copper bars, permanently soldered in place to give a perfect electrical contact. The rows are connected outside the box between large and solid binding posts.

is of wood with a 3-16-inch armor of steel; annular ball bearings are used at every point, excepting for axles; Timken roller bearings are used for road wheels. The car weighs 2,600 pounds, and wheels are fitted with 32 by 4-inch pneumatics front and rear.

In addition to the worm-drive model, the company also offers its usual line, among which Models 5, 6 and 10 are notable examples. In these models a side-chain drive is utilized, the motor is swung under the chassis frame nearly in the mid-position, and the battery is divided into two parts, one of which divisions is placed over each of the axles, and the road performance as the result of this battery division is noticeably good. It has been the aim of the company in the designing of each of its models to so arrange the control that a green operator may stay green; a mistake cannot result in an accident.

DETROIT ELECTRICS WILL USE EDISON'S NEW BATTERY

One of the reasons for the much increased popularity of the electric vehicle is the attention on the part of the manufacturers to the little details. In this respect, the makers of the Detroit Electric pleasure carriages have taken time by the forelock and announced the adoption of the newest Edison improved battery for the present season. It is claimed for this battery that it has a lessened weight for the same discharge ability, that it even has a greater discharge ability on lessened weight, which latter would mean that a vehicle with a lowered weight of batteries would run a farther distance on a single charge, that is, a lessened number of charges per season, making the whole car less bothersome as to charging. Five differing models of cars are listed as follows: H, a three-passenger roadster, of 87-in. wheelbase, 51-in. tread, driven by one 3-horsepower motor located on the rear axle, with a controller which affords five forward speeds and three reverse, with body supported upon an angle iron frame. Ball bearings are used on motor and transmission throughout the whole list of cars. On this model, the wheels and tires are 32 by 3 1-2 all around, the same as on all others. This sells at \$1,650. Next in order of price comes Model A, selling at \$1,900. This carries a two-passenger Victoria

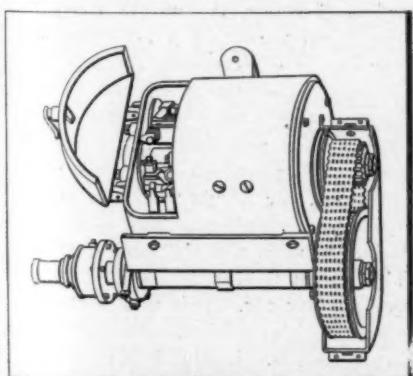
body, has an 80-in. wheelbase, and weighs 200 pounds more, otherwise it is the same. Above that comes Model E, a two-passenger coupé, at \$2,100. This weighs 2,300 pounds. The wheelbase agrees with Model H, as do also the tires. Model C is also a coupé, but sells at \$2,350. The wheelbase is shortened to 80 in., and the motor is placed in the middle of the chassis. On Model D, a four-passenger brougham at \$2,500, the same description applies, except that the weight is 2,400 pounds.

BAKER ELECTRIC IS A SHAFT DRIVE

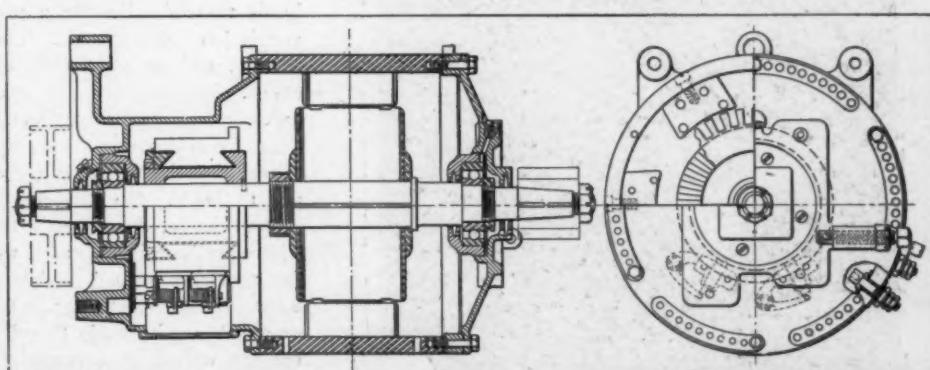
The Baker idea as it has been expounded for 1910 is with a view to conforming to the conventions as they are voiced by engineers in the automobile field in general—hence the shaft drive. Baker Electrics are made in four models, including a runabout which seats two, victoria with the same seating capacity, a coupé which seats two, and the largest size, which is also a coupé, has accommodation for four. Exide batteries are used in all Baker models, the smaller size being an 11 PV with 30 cells. This battery is divided and one-half of it is placed in the front of the vehicle and the other half to the rear. The \$2,000 victoria is fitted with an Exide 9 MV battery with 28 cells in two divisions, and this type of battery is used in the remaining models as well. The transmission in Baker models is through a silent chain to the shaft, and a live rear axle with a bevel drive serves for the rest. Ball bearings are relied upon to kill friction, and the weight of the respective models is very carefully trimmed, being 1,900 pounds for the runabout and 2,200 pounds for coupé.

FIVE RAUCH AND LANG CREATIONS WILL BE SHOWN

Chicago will see a full line of the R & L electric vehicles, which list will include no less than five stunning creations. These vary in price from the lowest to the highest, so that a car may be had suitable for every pocketbook. Beginning the list is Model 20, two-passenger Stanhope, at \$1,900. This car has one 2 1-2-horsepower motor located in the middle of the chassis. Power to run the motor is furnished by 9 M V Exide cells, 24 in number, divided into several parts so as to distribute the

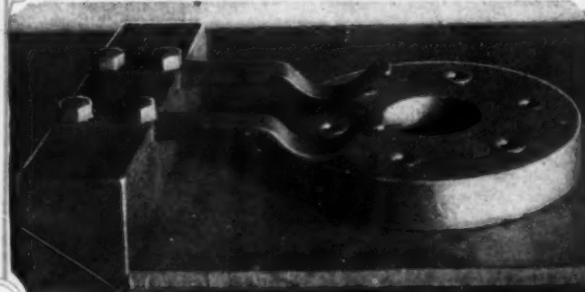
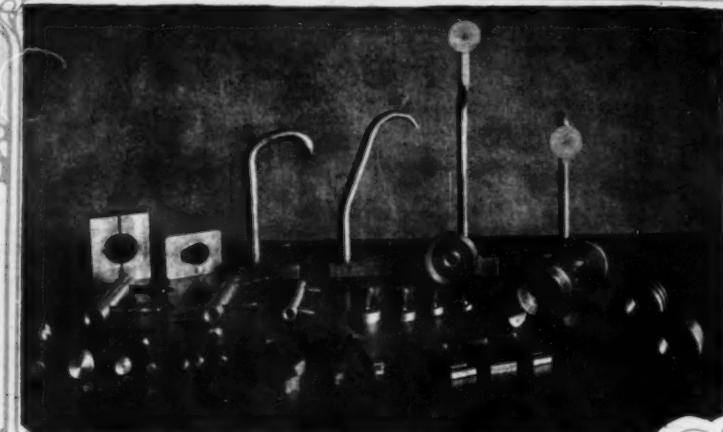
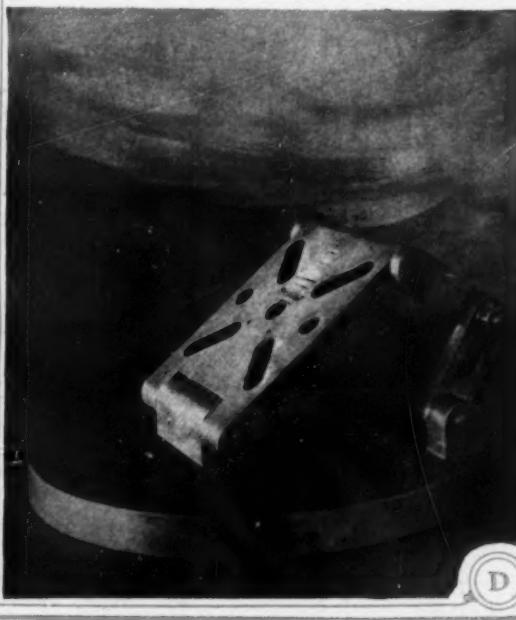
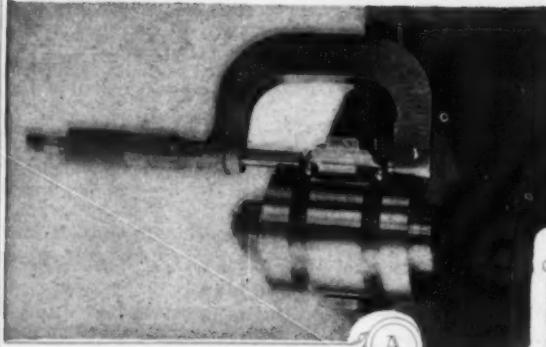


Motor, first reduction and countershaft of the Baker electric. The motor is a four-pole, series wound, and the reduction by silent chain; the propeller shaft connects on the left to the countershaft.



Longitudinal and lateral sections of a Waverley electric motor, for vehicle service. The field coils are indicated in their respective positions. They are altogether four in number. The armature is shown roughly, together with the means by which it is secured to the shaft, namely, a key, with a nut forcing it against a shoulder. The commutator seems wide and of proportions which will reduce sparking. The armature is mounted on ball bearings.

PLATE X.
METHODS OF
ACCURATELY SIZING



A—Micrometer measuring the center distances of inner races of a ball bearing.

B—Special measuring calipers or gauge used for sizing the walls of castings and tubes to within very close limits.

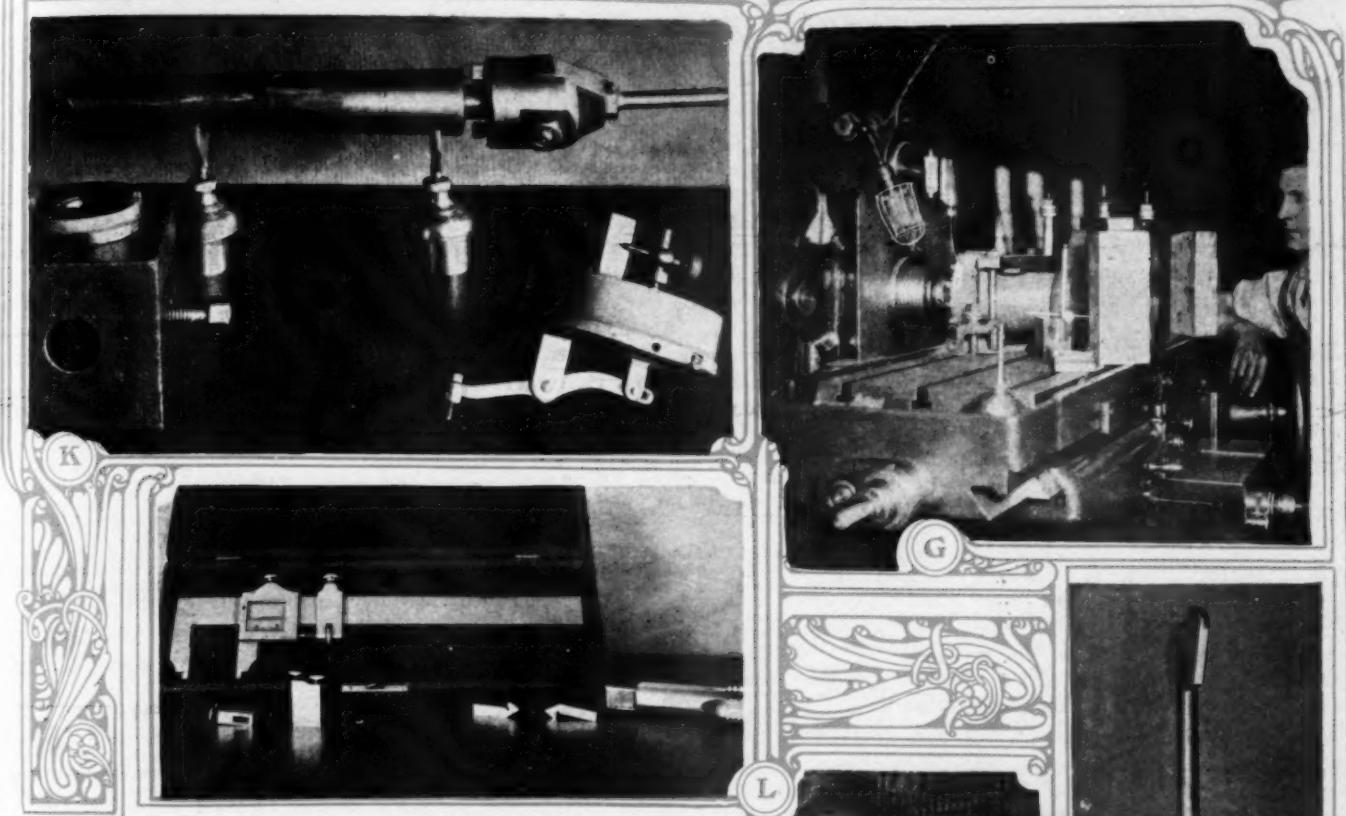
C—Extensometer fitted to a surface gauge resting on a surface plate, measuring the accuracy of the keyway in a jack-shaft.

D—Special form of tilting jig which may be set to any angle and locked in position, thus facilitating the drilling of holes which are out of the vertical or horizontal plane.

E—A collection of special measuring plug, ring, and other forms of gauges.

F—A special form of jig with accurately ground and hardened button head bushings, and a clamping means for use in reaming holes to great accuracy.

weight where it will do the most good, the same being unavoidable. The controller gives six forward speeds and three reverse, this number, like that of all electric vehicles, being far in excess of the number furnished on any other form of car than an electric. First reduction is by silent chain, while the final drive to the rear axle is by double side chains. The wheelbase is 77 in., while a tread of 53 in. is utilized. Despite a pressed steel frame, the weight ready to run is but 1,975 pounds. The tires used are 32 by 3 1-2 inches all around, and on all models except the most expensive and heaviest coupe. Ball bearings are used throughout, except in the case of the axles, which run on rollers. Model 22 is a three-passenger Stanhope, for which the makers ask \$2,100. The description above applies except that the weight is increased to 2,125 pounds, and the cells used are 11 M V. On Model 133, however, the number of cells is increased to 30, this being a two-passenger runabout selling at \$2,100. The wheelbase is increased to 85 inches, as is also the same quantity for all higher-priced models. The weight is slightly lessened, being 2,050 pounds. Model 23 is a very popular car. This is a four-passenger Victoria, made to sell at \$2,200. Twenty-four cells are used, but the weight is increased to 2,100 pounds. Lastly, Model 24 is a four-passenger coupe and sells at \$2,700. The weight is 2,550 pounds, in view of which the tires are enlarged, being 32 by 4 all around.



G—Surface gauge on the platen of a Brown & Sharpe No. 4B milling machine.

H—A depth gauge with a special terminal so made as to facilitate measuring.

I—Method of measuring the pitch of taps used in automobile manufacturing.

J—A pair of dwarfed jacks which are used in centering the work as shown.

K—A collection of instruments of precision which includes an extensometer on the right, dwarfed jacks under the socket, and a special jig to the left.

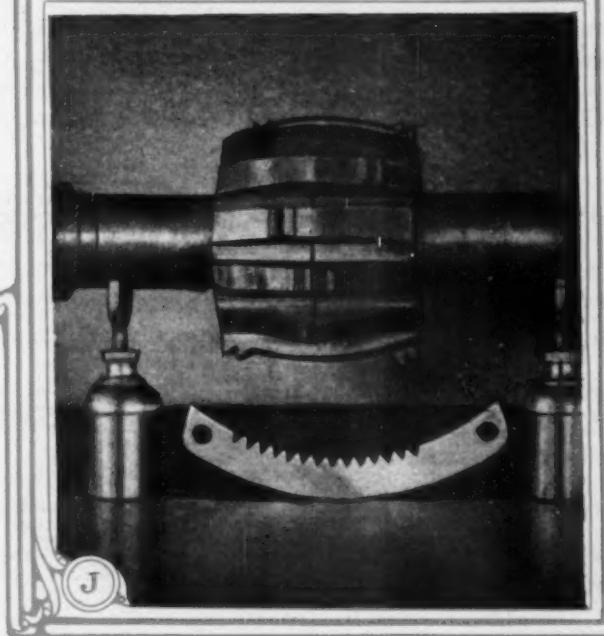
L—A set of micrometer calipers for in and outside measuring reading to thousandths.

Note—The illustrations as above given were furnished by the E. R. Thomas Motor Company, but are representative of the facilities which are used in first-class plants.

STUDEBAKER PLANS LAY STRESS ON STANDARDIZATION

With a reputation to uphold, as a branch of the company which makes the country's standard wagons and buggies, the Studebaker Automobile Company has designed a series of electric automobiles which will represent the latest development of electricity as an exact science. No type of power plant has been developed to the same degree as an electric. In gasoline and even in steam engineering practice, the designer never knows just what he will get until the first engine of a series is completed and set on the testing block. The electric motor, on the other hand, offers simply a problem in mathematics; its power can be figured with absolute accuracy while the drawings are still in the drafting room.

Thus it is not remarkable that the electric vehicles should have reached a condition of standardization far ahead of the gasoline ones. The Studebaker product, including five distinct models, varies only in the slightest details from that which bore the company's name last year. The motor, a standard design rated at 2 horsepower, though with an overload capacity of perhaps 300 per cent., is hung from the middle of the frame. It drives a short countershaft through noiseless herring-bone gears, and from the countershaft in turn a single chain drives the divided rear axle. The Studebaker Company makes five models, or differing body forms, on two distinct chassis.



A.A.A. CONTEST BOARD ANNOUNCEMENT

MEETINGS of the Contest Board of the American Automobile Association were held January 12 and 13, the following members being present: S. M. Butler, chairman; T. A. Wright, David Beecroft, Joseph H. Wood and P. D. Folwell.

The appeal of the Overland Automobile Sales Company, of Dallas, Tex., from the decision of the referee in awarding to the Mason car the first prize in the "North Texas Endurance and Good Roads Tour," held at Dallas, December 13 to 19, 1909, was submitted to the board. The appeal was overruled, and the decision of the referee affirmed, on the ground that the extreme

road and weather conditions justified the referee's decision.

The appeal of Messrs. Bireley & Young, of Los Angeles, entrants of the Columbia car, from the decision of the referee in awarding the first prize to the Pennsylvania car in the fifty-mile track race held on the Arizona Fair Grounds track, Phoenix, November 11, 1909, was considered and action deferred pending the receipt of further information.

The following is a list of the proposed contests for 1910, with approximate dates, from which the Contest Board will make up its official contest schedule:

IN THE EAST

Reliability Contests

Philadelphia, Century Motor Club, —.
Philadelphia, Quaker City M. C., April 15.
Denver to Mexico—Flag to Flag—G. A. Wahlgren, May 1.
Hartford, Auto Club of Hartford, May 1.
Harrisburg, Motor Club of Harrisburg, May 2 to 7.
Norristown, Norristown Auto Club, May 18.
Fort Worth, Fort Worth Star-Telegram, May 22.
Detroit, Detroit Auto Dealers' Association, May 25.
National (Glidden) Tour, A. A. A., June 15-30.
Denver, Denver Motor Club, June.
New York to Seattle, M. R. Guggenheim, July 4.
Philadelphia to Wildwood, North Wildwood Auto Club, July 2.
Minneapolis-Tribune, Minneapolis Auto Club, August 1.
Munsey Tour, Frank A. Munsey Company, August 15.
Minneapolis, Minnesota State Auto Association, August 31.
Philadelphia to Wildwood, North Wildwood Auto Club, September 3.
Cleveland, Cleveland Auto Club, September.
Kansas City, Auto Club of Kansas City, September.
Louisville, Louisville Auto Club, October 8.
Chicago, Chicago Motor Club, October 15.
Denver, Denver Motor Club, October.
Worcester, Worcester Auto Club, October.

Road Races

Denver, Denver Motor Club, May 30.
Riverhead, Motor Contest Association, June 1.
Cobe, Chicago Auto Club, June 25.
Grand Rapids, Grand Rapids Auto Club, middle July.
Denver, Denver Motor Club, September 5.
Lowell, Lowell Auto Club, September 5.
Vanderbilt, Motor Cups Holding Company, October 1.
Fairmount Park, Quaker City Motor Club, October 8.
Savannah, Savannah Auto Club, —.

Hill Climbs

Atlanta, Atlanta Journal, February 22.
Kansas City, Auto Club of Kansas City, April.

Bridgeport, Auto Club of Bridgeport, May 30.
Wilkes-Barre, Wilkes-Barre Auto Club, June 11.

Worcester, Worcester Auto Club, June 4.
Cleveland, Cleveland Auto Club, June.
Ossining, Upper Westchester Auto Club, June 18.
Plainfield, Plainfield Auto Club, July 11.
Richfield, Richfield Springs Auto Club, middle July.
Algonquin-Chicago, Chicago Motor Club, middle August.
Denver, Denver Motor Club, November.
Minneapolis, Minneapolis Auto Club, —.
St. Paul, Auto Club of St. Paul, —.

Track Races

New Orleans, New Orleans Auto Club, February 5 and 6.
Montgomery (Ala.) Auto Association, February 12 or April 20.
Birmingham, Birmingham Police Relief Association, April 27.
Atlanta, Atlanta Auto Association, May 5, 6 and 7.
Indianapolis Motor Speedway, May 29, 30 and 31.
Boston, Bay State Auto Association, May 30.
Brighton Beach, Motor Racing Association, May 30.
Philadelphia, Quaker City Motor Club, June 4.
Columbus, Columbus Auto Club, June 14.
Indianapolis Motor Speedway, July 1, 2 and 4.
Dallas, Dallas Auto Club, July 4.
Cheyenne (Wyo.) Motor Club, July 4.
St. Paul (Minn.), State Automobile Association, July 4.
Wildwood, Motor Club of Wildwood, July 4.
Wildwood, N. Wildwood Auto Club, July 4.
Cheyenne (Wyo.) Motor Club, August 6.
Wildwood, Motor Club of Wildwood, Sept. 5.
Wildwood, North Wildwood Auto Club, September 5.
Galveston, Galveston Cotton Carnival, July.
Kansas City, Auto Club of Kansas City, July 23.
Philadelphia, Quaker City Motor Club, August 6.
Indianapolis Motor Speedway, August 12 and 13.
Indianapolis Motor Speedway, September 2, 3 and 5.

PACIFIC COAST

Road Races

Santa Rosa, May 9.
Portland Rose Carnival, Portland Auto Club, June 11.
Santa Monica, Licensed Motor Car Dealers' Association, Los Angeles, July 4.
Mount Baldy, September 10.
San Francisco-Portola, Auto Club of California, October 23.
Los Angeles-Phoenix, Maricopa Auto Club, November 24.

Hill Climbs

Altadena, Licensed Motor Car Dealers' Association, Los Angeles, February 22.
Mile High Hill Climb, Redlands Mile High Hill Climb Association, November 24.

Track Races

Los Angeles (Cal.) Motor Racing Association, Jan. 9, Feb. 12 and 13, Mar. 12 and 13.
Los Angeles (Cal.) Motordrome Company, April 8, 9, 10.
Los Angeles (Cal.) Motordrome Company, April 13.
Los Angeles (Cal.) Motordrome Company, April 15, 16, 17.
Los Angeles (Cal.) Motordrome Company, 24-hour, April 30, May 1.
Santa Rosa, Santa Rosa Auto Association, May 15, 16.
Los Angeles (Cal.) Motordrome Company, May 29, 30, 31.
Los Angeles (Cal.) Motordrome Company, July 2, 3, 4.
Los Angeles (Cal.) Motordrome Company, Labor Day.
Seattle, M. R. Guggenheim, September 10, 11 and 12.
Spokane, Spokane Interstate Fair, —.

THE AUTOMOBILE CALENDAR

Feb. 5-12.....Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Feb. 14-19.....Buffalo, N. Y., Broadway Arsenal, Eighth Annual Automobile Show, Automobile Club of Buffalo. Dal H. Lewis, Manager, 760 Main street.

Feb. 14-19.....St. Louis, First Regiment Armory, Fourth Annual Automobile Show, St. Louis Automobile Manufacturers' and Dealers' Association, Robert E. Lee, Manager, 1829 Washington avenue.

Feb. 14-19.....Rochester, N. Y., Convention Hall, Third Annual Show, Rochester Automobile Dealers' Association. Captain C. A. Simmons, Manager.

Feb. 19-26.....Minneapolis, Minn., Third Annual Automobile Show, Minneapolis Automobile Association. Walter R. Wilmot, Chairman, Hotel Nicollet.

Feb. 10-26.....Newark, N. J., Essex Troop Armory, Automobile Show, New Jersey Exhibition Company.

Feb. 19-26.....Salt Lake City Auditorium, Automobile Show, Utah Automobile Dealers' Association. W. D. Rishel, Manager, 1-5 East First South street.

Feb. 19-26.....Cleveland, Central Armory, Annual Automobile Show under auspices of the Cleveland Automobile Show Company. H. M. Adams, Secretary.

Feb. 21-26.....Cincinnati, Music Hall, Automobile Show, Automobile Club of Cincinnati. Jesse Lippencott, Chairman Exhibits Committee, Gibson House.

Feb. 22-26.....Baltimore, Second Annual Automobile Show, Auto Club of Maryland, Fifth Regiment Armory.

Feb. 21-26.....Portland, Me., Auditorium, Fifth Annual Automobile Show. F. M. Prescott, Manager.

Feb. 22-27.....Milwaukee, Wis., Auditorium, Second Annual Automobile Show, Milwaukee Automobile Club.

Feb. 24-26.....Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 24-Mar. 3....Toronto, St. Lawrence Arena, Canadian Automobile Show, Ontario Motor League. E. M. Wilcox, Mgr.

Mar. 5-12.....Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park square.

Mar. 7-12.....Albany, N. Y., Armory, Automobile Show.

Mar. 12-19.....Syracuse, N. Y., State Armory, Automobile Show, Syracuse Automobile Dealers' Association.

Mar. 21-30.....Buffalo, N. Y., Convention Hall, Third Annual Power Boat and Sportsman's Show, Buffalo. Launch Club. D. H. Lewis, Mgr., 760 Main St.

Mar. 26-Apr. 2....Pittsburg, Pa., Duquesne Garden, Fourth Annual Show, Automobile Dealers of Pittsburg. Frank D. Sauppe, Chairman.

April 23-29.....Bangor, Me., Auditorium, Second Annual Eastern Maine Automobile and Motor Show. J. Henry Graham, Manager, Old Orchard, Me.



Vol. XXII

Thursday, February 3, 1910

No. 5

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A. B. SWETLAND, General Manager

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NATIONAL AUTOMOBILE SHOW FEATURES

With the opening of the doors of the Coliseum and the Armory, which will serve as an overflow, the great metropolis of the middle West will have in its midst a display of automobiles such as were never before assembled for inspection under such favorable conditions. That the show will be national in character is proven by the names which will be found on the list of exhibitors; they come from the East, the West, and the South, with not a few from the contiguous territory, which, in a geographical sense, stretches north to the frontier. The cars, which will be shown to the number of 101 separate exhibits, will be flanked by 171 accessory displays, and the slightest investigation of the situation will disclose a condition of the greatest business harmony, the entire absence of any suspicion of exclusion of any particular interest, and, in order that the ends will be met, the buying public will be afforded the fullest opportunity to examine them one and all, down to the last detail.



Comparison will be possible, and advantageous; the buyer who knows just what he wants will find it there; the prospective who is on the fence, as it were, will be able to climb down, and the maker who labored long under the delusion that he was the inventor of all that is good will find how futile it is to lock oneself up in a room, behind a stout door, with a sign on it which says,

"No admittance," to dream, uninterruptedly, and to evolve, possibly, a machine which will be a world-beater.

Best of the product of brains, when all is said, is that which is presented in a photograph of the composite of all such creative powers, including in a harmonious nest, but in orderly relation, the best of all the ideas which emanate from inner man.

Just as the motor, bereft of its balance wheel, will strike a discord, due to an inharmonious beat of its cyclic relations, so, may it be said, the designer who follows his own bent, uninfluenced by the good which surrounds him, will find, when he lines up in the grand review at the national exhibition, that his ideas will scarcely hobble down the highway of prosperity without a pair of good, strong crutches to lean upon.



Taking the universe as a pattern to go by, the mind which grasps the situation, looking at it broadly, is hardly likely to reach the conclusions that things just happen; that the sun, the planets, and the stars, were merely spilled into space, and left to trickle down from level to level, the plaything of circumstances, and as vagrants of a thoughtless child, ricochet as they travel, wearing to a threadbare suspicion of the mass of inception. So it is with the handiwork of thought when it is blended into a tangible thing by action; the thing will be representative of the thought, which, if it is the product of a finite mind, will scarcely compare with the more imposing array which will follow a concert of action, as when minds agree, and the product becomes the offspring of a pyramid of harmonious thoughts.

A national show—at which are gathered the products of a year of effort—is bound to result in the greatest good to the greatest number, since, when comparison is made under conditions of equality, the points of merit will come to the surface, and the things which are not worthy to survive will be roundly condemned by all.



In making comparison, the point of view must not be lost sight of; the automobile which will serve as a plaything for the idler who is struggling to lessen income is not likely to prove of great utility to the man who mortgages his homestead to acquire luxury on wheels, nor can it be said that a homely "draught horse" of an automobile will gracefully support the "family crest." To go to the show dressed in the right mind is to remember that every type of automobile has as a mate a user who will be well satisfied if envy is not allowed to cast a blur over the eyes, and in the moment of confusion substitute a white elephant for a pleasing companion.



Let the salesman rant of his wares; he is paid a stipend to do so, just as a lawyer is retained to defend a "case"—it may be one of little standing in law when the truth is bared. Go to the show, purchase with real money rather than with the exchange of a mortgage, and select the automobile which will do the very work for which it is intended, or, better yet, consider well the work to be done, and select the very automobile which is designed to above everything else thrive in that very class of service.

CONFLICTING STATEMENTS HAVE BEEN CIRCULATED

CHARLES Y. KNIGHT GIVES OUT THE ACTUAL FACTS

ABOUT THE KNIGHT MOTOR IN UNITED STATES AND ABROAD

NEW YORK CITY, Feb. 3—So many conflicting statements have been circulated in this country regarding the Knight motor in the United States, that I deem it advisable, in justice to the owners of the patents as well as to the public, to make a clear statement of the situation, and have also been requested to include some review of conditions abroad.

At present there are five licensees in Europe under the Knight patents, viz.: The Daimler Company, Ltd., of Coventry, England; Messrs. Panhard & Levassor, of Paris, France; the Daimler Motoren Gessellschaft (Mercedes Co.), Unterturkheim, Germany; Minerva Motor Company, Antwerp, Belgium, and the Deluca Daimler Company, Ltd., of Naples, Italy. We issue only one license for each European country, and there are three unimportant states where we have yet to license anybody.

The Daimler Motor Company, Ltd., of England, took this motor up in December, 1907, and began delivering cars equipped therewith in December, 1908, putting out about 800 large cars during the season ending September 30, 1909. Aside from these cars of the 1909 type, they replaced nearly 100 of their 1908 poppet valve motors with the Knight motor for customers, and sold a number to go abroad to other motor car companies. They have not built a single motor of the poppet valve type since taking up the Knight motor, and are employing it in their omnibus and railroad car work. Their output for 1909 comprised motors of the following dimensions and R. A. C. rated powers

H.P.	Dimensions	No. Cyl.
38	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	4
57	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	6
48	5 $\frac{1}{2}$ x 6	4
22	3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	4

For the first two months of the 1910 season this firm's sales exceeded the output for the entire 1908-1909 season by quite a number of cars. This company won the Royal Automobile Club's Dewar Trophy for the best certified performance of the year with two motors (38 and 22 horsepower), which ran for six days and nights continuously under full power, the 38 horsepower averaging nearly 55 horsepower at 1,200 per minute, and the 22 averaging more than 38 horsepower at 1,400, and then these motors were placed in standard cars and run 2,000 miles on Brooklands, at the rate of 42 miles per hour, without a single mechanical hitch.

Daimler cars also won numerous hill climbs in England during the year, and were the first English built cars to sell in any number in France.

The next to get ahead with these motors was the Minerva Company, of Belgium, who took the work up about six months later than Daimler and only managed to get in with a few 38-horsepower four-cylinder cars in 1909. These were built with 20 per cent. offset of the crankshaft, were very fast, and one in the hands of their Glasgow agents won the Scottish Cup for lowest fuel consumption in the Scottish trials last summer, against 68 competitors from all over the world, covering 1,000 miles at an average of 24.96 miles per imperial gallon of petrol, and making fastest combined time on the hills and mountains of the course, both as to actual time and under formula, and winning medal therefor. In two miles the consumption worked out 45 to the gallon and was 10 per cent. better than any other car has done in these drastic trials.

For the season of 1910 the Minerva Company is making no poppet valve motors whatever, producing the Knight motor in three sizes—16, 26 and 38 horsepower, four cylinders. Their entire 1910 product was sold previous to October 1, 1909, among the various countries of Europe. Their 38 horsepower during 1909 won many hill climbs and races on the continent and in England, in addition to the Scottish Trials victory.

Panhard & Levassor will be delivering cars equipped with Knight motors in May or June of this year. Their first demonstrating car was sent to their London agents in December and was equipped with a four-cylinder motor, dimensions 4 by 5 1-2, which under test developed 43 horsepower at 1,140 revolutions. This company will not produce a great many cars of this type during 1910, owing to the lack of preparation and proper tools, having subjected the motor to 15 months of the most severe tests which could be devised before finally adopting it. One agent alone has guaranteed to contract for the entire 1910 output of cars equipped with this motor at a premium of \$300 per car over the same chassis with the poppet valve motor.

The Mercedes Company will not get into the market until late in the Fall, this company being the last in Europe to take up the

No. of Revolutions per minute	Knight Motor 4 cylinders 3 3-4 x 5 in.	B.H.P. of 6-cylinder Engine, 4 x 4 3-4-in. Poppet Valves
400	12	12.1
500	16	16.6
600	21	20.8
700	25	24.8
800	29	28.4
900	33	32
1,000	37	34.6
1,100	40.5	37.4
1,200	45	39.8
1,300	48	41.8
1,400	51	43.6
1,500	54	45.2
1,600	56.5	46.5
1,700	58.5	47.5
1,800	61.25	48.2

motor. Machine work will begin upon parts in May and cars will probably be ready for Fall delivery. Their motors have given splendid results under test, the 38-horsepower four-cylinder (4 7-8 x 5 7-8) showing 61 horsepower at 1,300 and the 22-horsepower (3 3-4 x 5 1-8) 50 horsepower at 2,000 revolutions.

The Deluca Daimler at Naples will not be in the field until late in 1910.

In America we have made no great effort to start going. The industry has been booming to such an extent that the manufacturers have been reluctant to make a start upon a new program, and we have been too busy abroad superintending the introducing of our motor over there to permit us to devote a great deal of attention to this large field. In Canada the Canada Cycle & Motor Company have acquired the rights for use in the Russell car, E. L. Russell, the manager, having come across to England during the summer of 1909 to make the arrangements. They are now putting out cars of their own construction equipped with 22 and 38-horsepower Daimler (English) and Minerva (Belgian) motors and have been very successful. Some idea of the interest aroused by the appearance of these motors in Canada may be gathered from the fact that more than 1,300 people last week attended a meeting held under the auspices of the Engineering Society of the Faculty of Applied Science of the Toronto University upon the occasion of an address by the inventor relating to features of the motor.

The tendency so far as our own business is concerned is toward a stroke of about 5 inches regardless of bore, and there is no doubt an inclination in Europe toward a stroke at least 25 per cent longer than the bore, up to 6 inches. The entire English and European industry look askance at the colossal concerns upon this side, fearing a flood of cheap cars to the other side when the pendulum finally swings to the other extreme, or when what they regard to be the inevitable reaction comes.

(Signed) CHARLES Y. KNIGHT.

MAXWELL-BRISCOE, COLUMBIA, BRUSH RUNABOUT MERGER

UNITED STATES MOTOR COMPANY RAPIDLY CRYSTALLIZING

SIXTEEN-MILLION-DOLLAR AGGREGATION OF MOTOR INTERESTS

BENJAMIN BRISCOE, having just returned from Detroit, where a conference was held with Frank Briscoe, President of the Brush Runabout Company, and the Briscoe Mfg. Company, carried in his wake a series of persistent rumors which have for their purport much more definite matter involving the future of the United States Motor Company, than that which passed current in recent days. The best information available at this time is to the effect that the Maxwell-Briscoe, Columbia, Brush Runabout, Briscoe Mfg. Company, Ajax-Grieb Rubber Company, Westchester Appliance Company, and other concerns of a representative character, are the moving spirits in this monster re-arrangement of automobile interests. To what extent this nucleus will gather force is a matter which will have to be confined to speculation. The character of the men and the companies represented in this new line-up is such as to whet the imagination, and it is anticipated by the knowing ones in the inner circle, that the United States Motor Company is destined to rival the Napoleonic movements of the most ambitious efforts in recent times; it being the idea, according to reports, to coalesce a series of companies, each one of which is to be a leader in its particular line of endeavor, financially self-sustaining, and so situated with respect to the market that the united concerns will add their respective quota without overlapping. In this way, it will be possible to reap advantages in all directions, because each unit in the big combination will be habitually expert in its own particular line, and the sum of these units will be of concentrated advantage, due to the combined ability under conditions of economy of management, which should result in the greatest good to the purchasing public, taking the form of superior product at the minimum cost.

It has long been understood by those who keep informed as to the strength of the undercurrent in automobile circles, that the General Motors Company had its eye on the Maxwell-Briscoe series of plants, which it hoped to augment by taking over the big new plant in which Brush runabouts are made. Frank Briscoe seems to have been adamant in the face of all these tempting offers, and perhaps the present proposed creation represents the gist of the real answer; at all events the market has evidently suspected something from the quarter which is dominated by the Maxwell-Briscoe interests, and the

activities of the General Motors Company in the direction of acquiring these interests led to speculation of the groundless sort.

The market was merely blinded by the known fact that the General Motors Company wanted to make a combination, and while rumor mongers basked in the light of this one idea, the real scene was being shifted into presentable shape behind an asbestos curtain.

The United States Motor Car Company was quietly incorporated under the laws of the State of New Jersey, and the capitalization was stated to be \$2,000, which inconspicuous sum lent an air of mystery to the project when it was learned that the Maxwell-Briscoe string of capital had its finger in the pie. C. W. Kelsey, of the Maxwell-Briscoe Company (head of the sales organization), is arranging to take up his new duties in Hartford, and the old Columbia Motor Car Company is bound to feel the energizing presence of Kelsey, as soon as he is able to find a suitable residence for himself and family, which, however should not be an extremely difficult task in Hartford.

That it is considered a move of the greatest importance for the United States Motor Car Company to acquire the Columbia Company is readily seen when the point is made that the Columbia Company, under the skillful management of the late George H. Day, secured control of the Selden patent, and this company has always represented the dominant situation in the management of the Selden patent. When the Maxwell-Briscoe Company, Premier, and five or six others, came down the A. M. C. M. A. tree, it was little thought that by a skillful move on the part of the Maxwell-Briscoe interests, they would climb to a more favorable position on the other tree which the Court put its mark of favor on. Around Hartford, the situation seems to be fairly well understood, and the automobile fraternity there is aroused to a high pitch of anticipating excitement.

There are quite a number of side lights to be attached to the latest move, as, for illustration, the string of capital which controls the destinies of some well-known Philadelphia electrical companies (one in particular) is said to be allied with the Maxwell-Briscoe line-up. This should not be surprising since the connection which has ever existed between Philadelphia capital and the Columbia Company would still have to be taken into account.

A.M.C.M.A. TO BE DISBANDED AT CHICAGO

While it is true that the controlling factors in the A. M. C. M. A. will not disclose beforehand the action which will be taken at the meeting which will be held in Chicago during the National Show time, it is fairly good inside information that the A. M. C. M. A. is to be abandoned. It was originally organized under a contract for five years, and the time will expire within the next week or two. That this contract will not be renewed is largely due to the absence of companies outside of the A. L. A. M. When the atmosphere clears up, the only company left will be the Ford Motor Company, and while it seems quite certain that the Ford will continue as heretofore, the fact remains that the A. M. C. M. A. was organized almost independently of the position which was previously assumed by Henry Ford. He is still sticking to his position as then taken, and the disbanding of the A. M. C. M. A. is simply a logical move in the absence of members to support it. An association without members is in a rather anomalous position.

ALL BUT FORD TO BREAK INTO A.L.A.M.

It is now fairly understood that all the companies which were joined together under a contract for five years, and were known as the A. M. C. M. A. will be admitted into the fold under terms which THE AUTOMOBILE published some time since, but it was not then assured that the entire list of A. M. C. M. A. would come over. While the association is acting upon these names, seemingly one at a time, the fact remains that there is a place, apparently, for each one of the A. M. C. M. A. companies, with the understanding, of course, it desires a seat at the board.

RUSHMORE AND DIETZ LAMP FIRMS MERGE

It is announced that the Rushmore Dynamo Works, of Plainfield, N. J., and the R. E. Dietz Co., of New York City, have effected a combination to promote the sale of Rushmore lights and generators and Dietz oil lamps. Numerous improvements will be made, and the factory facilities greatly increased.

LIST OF ACCESSORY EXHIBITS

HORNS AND SPEEDOMETERS

Auto Improvement Co., New York.
Gabriel Horn Mfg. Co., Cleveland, O.
Hoffecker Company, Boston, Mass.
Jones Speedometer Company, New York.
Lovel-McConnell Mfg. Co., Newark, N. J.
Stewart & Clark Mfg. Co., Chicago, Ill.
Veedor Mfg. Co., Hartford, Conn.
Warner Instrument Co., Beloit, Wis.

LUBRICANTS AND LUBRICATORS

Cook, Adam, Sons, New York.
Dixon, Joseph, Crucible Co., Jersey City, N. J.
Hancock Mfg. Co., Charlotte, Mich.
Harris, A. W., Oil Co., Providence, R. I.
Havoline Oil Co., New York.
McCord Mfg. Co., Detroit, Mich.
N. Y. & N. J. Lubricants Co., New York.
Randall-Faichney Co., Boston, Mass.

SHIELDS, TOPS AND MOUNTINGS

Chicago Wind Shield Co., Chicago, Ill.
Cowles, C., & Co., New Haven, Conn.
Fellwock Auto & Mfg. Co., Evansville, Ind.
Garage Equipment Co., Milwaukee, Wis.
Hayes Mfg. Co., Detroit, Mich.
Kimbball, C. P., & Co., Chicago, Ill.
Mezger, C. A., New York.
Pantasee Co., New York.
Rands Mfg. Co., Detroit, Mich.
Sprague Umbrella Co., Norwalk, O.
Standard Varnish Works, Chicago, Ill.
Troy Carriage Sunshade Co., Troy, O.
20th Century Motor Car Supply Co., South Bend, Ind.
Valentine & Co., New York.
Vanguard Mfg. Co., Joliet, Ill.
Vehicle Top & Supply Co., St. Louis, Mo.

CARBURETERS AND GAS TANKS

Bowser, S. F., & Co., Fort Wayne, Ind.
Breeze Carburetor Co., Newark, N. J.
Byrne-Kingston & Co., Kokomo, Ind.
Gasoline Motor Efficiency Co., Jersey City, N. J.
Gilbert Mfg. Co., New Haven, Conn.
Holley Bros. Company, Detroit, Mich.
Mosier, A. R., & Co., New York.
Stromberg Motor Devices Mfg. Co., Chicago, Ill.
Wheeler & Schebler, Indianapolis, Ind.

SUPPLIES

Detroit Motor Car Supply Co., Detroit, Mich.
Excelsior Supply Co., Chicago, Ill.
Gilbert Mfg. Co., New Haven, Conn.
Standard Auto Supply Co., Chicago, Ill.
United Manufacturers, New York.

OTHER STRUCTURAL PARTS

Auto Parts Mfg. Co., Muncie, Ind.
Baldwin Chain & Mfg. Co., Worcester, Mass.
Bretz, J. S., Co., New York.
Brown Lipe Gear Co., Syracuse, N. Y.
Continental Motor Mfg. Co., Muskegon, Mich.
Cook's Standard Tool Co., Kalamazoo, Mich.
Cramp & Sons Ship & Engine Co., Philadelphia.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Driggs-Seabury Ordnance Corp., Sharon, Pa.
Duff Mfg. Co., Pittsburgh, Pa.
Elite Mfg. Co., Ashland, O.
Excelsior Motor & Mfg. Co., Chicago, Ill.
Fleinte, Ernst, Cambridge, Mass.
Franklin, H. H., Mfg. Co., Syracuse, N. Y.
Gemmer Mfg. Co., Detroit, Mich.
Globe Machine & Stamping Co., Cleveland, O.
Hartford Suspension Co., Jersey City, N. J.
Imperial Brass Mfg. Co., Chicago, Ill.
Link-Belt Mfg. Co., Philadelphia, Pa.
Long Mfg. Co., Chicago, Ill.
McCord Mfg. Co., Detroit, Mich.
Meisinger, H. & F., Mfg. Co., New York.
Motor Parts Co., Plainfield, N. J.
Muncie Gear Works, Muncie, Ind.
Oliver Mfg. Co., Chicago, Ill.
Perfection Spring Co., Cleveland, O.
Ross Gear & Tool Co., Lafayette, Ind.
Sager, J. H., Rochester, N. Y.
Smith, A. O., Co., Milwaukee, Wis.
Spicer Universal Joint Co., Plainfield, N. J.
Standard Roller Bearing Co., Philadelphia, Pa.
Standard Welding Co., Cleveland, O.
Timken-Detroit Axle Co., Detroit, Mich.
Timken Roller Bearing Co., Canton, O.
Triple Action Spring Co., Chicago, Ill.
United Manufacturers, New York.
Warner Gear Co., Muncie, Ind.
Warner Mfg. Co., Toledo, O.
Whiteley Steel Co., Muncie, Ind.
Whitney Mfg. Co., Hartford, Conn.

ACCESSORY DISPLAY

GRANTING that the automobiles will all be lined up at the Ninth Annual Exhibition at the Coliseum and the Armory, all is not said. Separating out the accessories, in order that they may be the more conveniently examined, is all that it amounts to—the very cars which present such a fine spectacle, are only so because they are graced by the very accessories of which they are largely composed. Considering the accessories then, taking them away from the automobiles on which they rightfully belong, is but a convenience.

These units of automobiles, when they are properly considered, may well be separated out into classes, and in the process, to accept one of two or three schemes is a necessity. Trade considerations are at the bottom of some of the methods of classifying; tires, for illustration, are scarcely accessories—automobiles, to be of any use at all, must be equipped with them. In the long run, if the question is to receive intelligent treatment, the autoist who desires to advance on a firm footing, must remember:

(A) So-called accessories, provided they must be a part of an automobile if it is to run at all, belong to a class here designated as "units."

(B) Accessories, which are not essential to the running of a car, but, on the other hand, are present on a car if law and safety are given due weight, become accessories of necessity.

(C) The remaining consideration involves accessories of convenience—accessories which can be done without considering the running of the automobile, or the law, and safety.

Parts makers, as a rule, manufacture, from submitted designs, parts of units, and, from a logical point of view, belong to another class, or better yet, are as an annex of the automobile makers who employ them. Unit makers, since they evolve designs, have in mind the furtherance of their own interest, insofar as the establishing of a reputation for turning out good units becomes as a stock in trade which is ordinarily designated as "good will."

Accessories of necessity, under the classification here suggested, will be a little difficult to separate out; speedometers, according to some are not necessary; judging speed, on the other hand, is exceedingly difficult, and the autoist who regards the law, must admit that it is necessary to know the speed which is being made at any time in order to keep within the law. Take the ignition system, as an illustration of the difficulty involved in making a logical classification, and it is at once apparent that the magneto is a necessity, but it cannot be so readily shown that the auxiliary coil and battery is entitled to this rank—the coil is used when the magneto fails; true, under such conditions the coil will become a necessity, but this truth ranks with the conclusion which must be reached if the whole motor becomes deranged—another motor will have to be supplied.

Lamps are accessories of necessity when automobiles are run in the night time—they are merely ornaments in broad daylight; the necessities rule, however, in making the classification. When the whole situation is adequately explored, it is difficult to separate out the accessories of convenience; perhaps a foot-warmer is in this class; mayhap a grademeter responds to the name, and it is convenient to have a time-piece on the dash, or a guide-book in the locker, a place for extra wraps, room for a trunk, and a windshield to break the force of the on-coming blast—let it be dust, wind, or the pesky messenger of the elements which takes on the form of hail, not forgetting a swarm of gnats.

WIDE AND VARIED

It is convenient, of course, to have a pair of goggles—are they necessary? Some times! Tops, for touring cars; they are as the "umbrella." Chains, for wheels; they prevent skidding. Extra tires—not so necessary these days when tires of good selections, and large enough for the work, are in common use—they are as a safeguard. If extra tires are taken along, why abuse them by allowing strong light, the product of inclement weather, and silt of the road to perch upon them—tire life is measured by two kinds of instruments, one of which is called "long" and the other "short." The particular one of these measuring instruments—instruments of precision, let us say, to take along, will depend upon the quality of the casing which hides the tires.

Lubricating oil is the "diplomat" of the automobile; it is as the go-between when friction and the "chip" which is on the shoulder of a journal begin to rub elbows. A can of lubricating oil is mighty handy; a convenience, let us admit, which has necessity as a first cousin. Grease! it is the diplomat's secretary. This same grease, in its capacity of secretary, does the dirty work; stands as a buffer between the silt of the road and the delicate surfaces of the plurality of bearings which are not provided with a drawing room in which to ceremoniously receive the prince of lubricants—oil.

The know-it-all who is so fond of saying that grease is out of a job until a journal warms up, ignores the fact that oil is not necessary in a bearing which will not warm up—let us have the can of solid lubricant; some of it belongs in the transmission gear system, more in the steering gear, a little in the eyes of the springs, a smear over the knuckle-pin, and a little here and there; with a portion in reserve.

Shock absorbers, while they are regarded as accessory features of automobiles, are so necessary that the automobile which speeds without them is far on the road to the guillotine; they soften the blow which comes when an obstruction rises up out of the roadway, and afford a second advantage—riding has more of pleasure, a better assurance of a safe ending, and less of the thought that the score will draw heavily upon the bank account. The need of shock absorbers, while it is absolute if the spring suspension is but poorly designed, is also present in proportion to the weight of the automobile and as the square of the velocity.

In the maintenance of tires, considering the composition of them, which is frictioned fabric in alternate layers with rubber, to measure life on the long scale, there are two or three details which must not be disregarded—the tires must be stoutly inflated and maintained in this state at all times. Besides inflating, in view of the ills which follow if dampness contacts with the bared fabric, it is essential to success that the fabric be kept coated with rubber. To assure this condition, it is necessary to repair each little score just when it happens; the fabric being cotton, serves as a wick, and the water which will be drawn in, is sure to carry along a myriad of mildew microbes.

It is useless to smear cut rubber over a wound—the rubber must be vulcanized; a vulcanizer is the accessory which will do the work quickly and well. As for inflation, it has been stated by experts of undoubted competence, that the autoist is not living who will be able to inflate a 36 by 5-inch tire to excess by using any manual tire pump made. The danger lies in not inflating sufficiently, and, without a gauge to tell of the growing pressure, it is very easy to allow the tired muscles of the man to act as the gauge—a tired man is a mighty poor gauge when it comes to the matter of coaxing long life out of a tire.

LIST OF ACCESSORY EXHIBITS

PUBLICATIONS

The Automobile, New York.
Chilton Printing Co., Philadelphia, Pa.
Class Journal Co., New York.
Motor Age, Chicago, Ill.
Motor, New York.
Official Automobile Blue Book, Chicago, Ill.

MAONETOS AND TIMERS

Atwater-Kent Mfg. Co., Philadelphia, Pa.
Bretz, J. S., Co., New York.
Connecticut Telephone & Elec. Co., Meriden, Conn.
Heinze Electric Company, Lowell, Mass.
Hera & Co., New York.
Lavalette & Co., New York.
Motsinger Device Mfg. Co., Pendleton, Ind.
Remy Electric Co., Anderson, Ind.
Simms Magneto Co., New York.
Spliedorf, C. F., New York.
Witherbee Igniter Co., New York.

MOTORCYCLES

American Motor Co., Brockton, Mass.
Aurora Automatic Machinery Co., Aurora, Ill.
Consolidated Mfg. Co., Toledo, O.
Excelsior Supply Co., Chicago, Ill.
Greyhound Motor Works, Buffalo, N. Y.
Harley-Davidson Motor Co., Milwaukee, Wis.
Hendee Mfg. Co., Springfield, Mass.
Hornecker Motor Mfg. Co., Genesee, Ill.
Merkel-Light Motor Co., Pottstown, Pa.
New Era Gas Engine Co., Dayton, O.
Pierce Cycle Co., Buffalo, N. Y.
Reading Standard Co., Reading, Pa.
Reliance Motor Cycle Co., Owego, N. Y.

IGNITION OTHER THAN MAGNETOS

American Elec. Nov. & Mfg. Co., New York.
Apple Electric Co., Dayton, O.
Benford, E. M., Mt. Vernon, N. Y.
Briggs & Stratton, Milwaukee, Wis.
Electric Storage Battery Co., Philadelphia, Pa.
Hardy, R. E., Co., New York.
High Frequency Ignition Co., Los Angeles, Cal.
Kokomo Electric Co., Kokomo, Ind.
Mezger, C. A., New York.
Mosler, A. R., & Co., New York.
National Carbon Co., Cleveland, O.
National Cell Co., Lansing, Mich.
Never-Miss Spark Plug Co., Lansing, Mich.
U. S. Light & Heating Co., New York.
Vesta Accumulator Co., Chicago, Ill.

LAMPS, OIL AND ELECTRIC

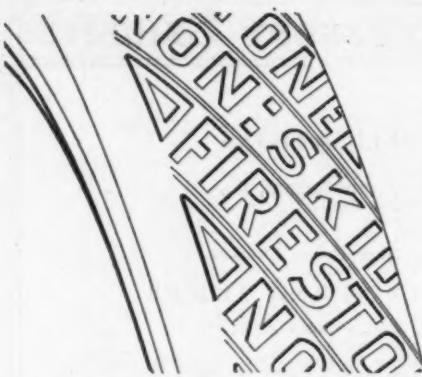
Badger Brass Mfg. Co., Kenosha, Wis.
Dietz, R. E., Co., New York.
Edmunds & Jones Mfg. Co., Detroit, Mich.
Gray & Davis, Amesbury, Mass.
Ham, C. T., Mfg. Co., Rochester, N. Y.

MISCELLANEOUS

Breakstone, S., Chicago, Ill.
Fulton-Zinke Co., Chicago, Ill.
Gates-Osborn Mfg. Co., Marshalltown, Ia.
Morrison-Ricker Mfg. Co., Grinnell, Ia.
Motor Specialty Co., Detroit, Mich.
Norton Co., Worcester, Mass.
Overland Sales Co., Chicago, Ill.

TIRES, RIMS AND SUPPLIES

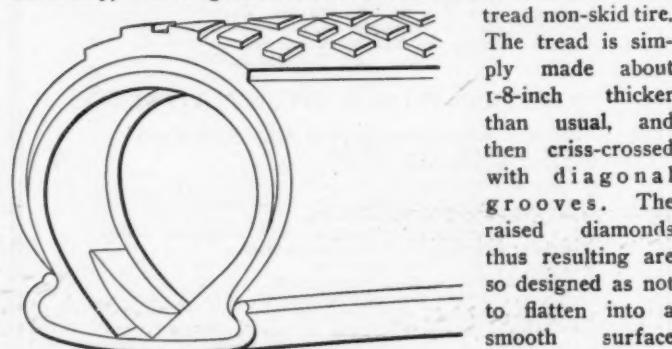
Ajax-Grieb Rubber Co., New York.
Batavia Rubber Co., Batavia, N. Y.
Continental Caoutchouc Co., New York.
Consolidated Rubber Tire Co., New York.
Dayton Rubber Mfg. Co., Dayton, O.
Diamond Rubber Co., Akron, O.
Empire Tire Co., Trenton, N. J.
Federal Rubber Co., Trenton, N. J.
Firestone Tire & Rubber Co., Akron, O.
Fisk Rubber Co., Chicopee Falls, Mass.
Fox Metallic Tire Belt Co., New York.
G & J Tire Co., Indianapolis, Ind.
Goodrich, B. F., Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hartford Rubber Works, Hartford, Conn.
Leather Tire Goods Co., Niagara Falls, N. Y.
Michelin Tire Co., Milltown, N. J.
Morgan & Wright, Detroit, Mich.
Motz Clincher Tire & Rubber Co., Akron, O.
Pennsylvania Rubber Co., Jeanette, Pa.
Republic Rubber Co., Youngstown, O.
Royal Equipment Co., Bridgeport, Conn.
Shaler, C. A., Co., Waupun, Wis.
Swinehart Clincher Tire & Rubber Co., Akron, O.
Thermold Rubber Co., Trenton, N. J.
Universal Tire Protector Co., Angola, Ind.
Weed Chain Tire Grip Co., New York.



No label is needed on the Firestone non-skid, which has its name printed on it some thirty times, and leaves its mark as it goes.

SOLUTIONS of the tire problem are many and various, and although grumbler may say that it is not really solved yet, still the situation has been reduced to a point where tires are fairly reliable and can be expected to give a known amount of service. Non-skid treads are especially in evidence, and the forms of demountable and quick-detachable rims show evidence of great inventive skill having been expended on them.

The latest production of the Ajax-Grieb Company, of New York City, following out the lines indicated above, is a diamond tread non-skid tire. The tread is simply made about 1-8-inch thicker than usual, and then criss-crossed with diagonal grooves. The raised diamonds thus resulting are so designed as not to flatten into a smooth surface when bearing the weight of the car, as they might be.

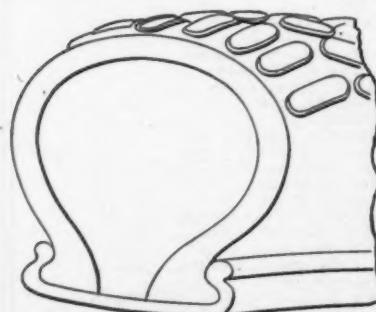


Diamond-shaped projections, arising from an already thickened tread, distinguish the Empire, new anti-skid tire.

supposed to do. Of course, all Ajax tires will continue to be guaranteed for 5,000 miles, according to the well-known plan.

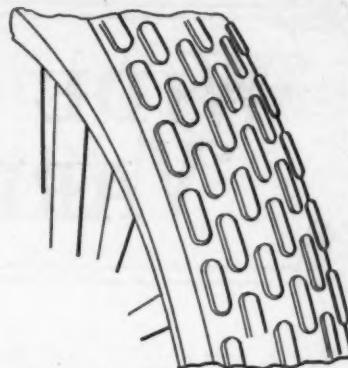
The Continental demountable rim, marketed by the Continental Caoutchouc Company, of New York City, is one of the automobile's old stand-bys. It shows few changes over the 1909 form. The clincher rim on the inner side bears against a permanent flange, and on the outer is retained by a series of wedge-shaped lugs on bolts which pass through the felloe. Lugs on the under side of the clincher rim rest in notches in the felloe rim, so preventing rotation. Continental non-skids are also shown.

Dayton airless tires are again shown without change, except in that different styles of treads are offered to the purchaser. One of these, which the company calls a double-grip non-skid, has a flat corrugated tread with diagonal depressions about an inch apart.



Morgan & Wright has oblong projections arranged in two spiral series, alternating with each other.

TIRES RIMS AND CHAINS



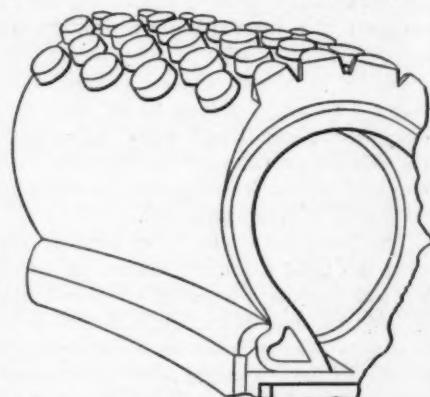
"Staggard" tread, with circumferential rows of oblong projections, characteristic of the Republic, non-skidding tire.

buggies and commercial vehicles by showing a complete line of these, in addition to its well-known pneumatics. A new demountable rim also appears under the Diamond banner; it is of the bolt-retained type and looks solid and substantial. Several varieties of anti-skid treads also are shown at this stand. This company also manufactures hard rubber steering wheels and battery boxes.

The checkered tread tire which appears at the stand of the Empire Tire Company, Trenton, N. J., is another variation of the groove idea; in it, however, the diamonds stand out separately on a raised portion of the tread. The Empire demountable rim is of the bolt-retained type; it is not necessary to remove the nuts on these, but merely to loosen them. The lugs may then be turned aside and the rim slipped off over them. This does away with the annoyance of losing these small parts in the road dust or mud.

The Federal non-skid, brought out by the Federal Rubber Company, of Milwaukee, Wis., has an idea apparently unique among the supporters of the all-rubber tread. These tires, known as the "cross-country type," have around their circumferences three rows of maltese crosses molded in the rubber. The rows are staggered with relation to each other, and the great number of sharp points seems well adapted to give a thoroughly firm grip on the road, even under the worst conditions.

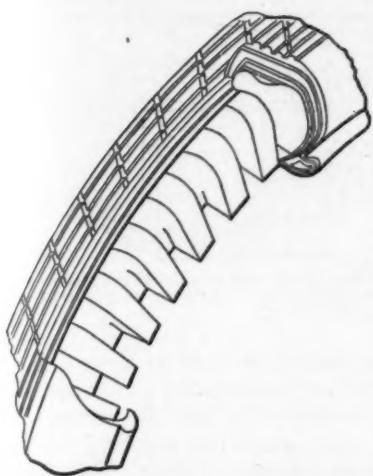
No one could mistake the Firestone non-skid, no matter how unlearned he might be in technical matters; for it has its name written across it in bold letters some twenty or more times. The Firestone Tire & Rubber Company, which is another of the Akron group, believes in the all-rubber tread. The Firestone demountable rim, of the through-bolt type, differs from the ordinary run in that it is adapted to carry clincher rims of the



The time-tried Bailey tread is retained on the Diamond, and gives satisfactory service, both summer and winter.

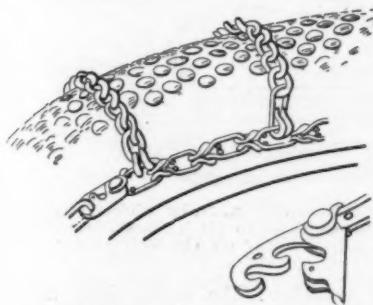


Ajax non-skid has diamond-shaped projections, formed by cutting grooves in the tread.



Dayton "airless" tires have a non-skid tread, formed by a novel method of grooving the surface rubber.

The anti-skid chains made by the Fox Metallic Tire Belt Company, of New York City, have their links stamped out of sheet metal. They are bent and interlocked, giving the effect of a flat steel band, with small square projections which make contact with the road surface. These cross chains are attached by side chains of the usual type, drawn together by a patent clamp with a lever to secure a good tension and prevent noise.



Weed chain grips in improved form, with the snap connection shown in detail beneath.

how, with its long experience, and automobilists certainly are not backward in investing their hard-earned cash in its product.

The Palmer web tires which have been used with such success on electric cars during the past season, come from the Akron, O., factory of the B. F. Goodrich Company, another veteran of the industry. It is claimed that the use of these tires has exceptionally good influence upon the single-charge mileage capability of the average electric. Of course, the standard clincher pneumatics are not being neglected; a specialty is being made of interchangeable odd sizes for cars sent out with undersized rims.

In addition to its Bailey tread non-skid the Goodyear Tire & Rubber Company, of Akron, O., has brought out a heavier non-skid of the raised diamond type. This is expected to find much success in taxicab service, of which the Goodyear Company is

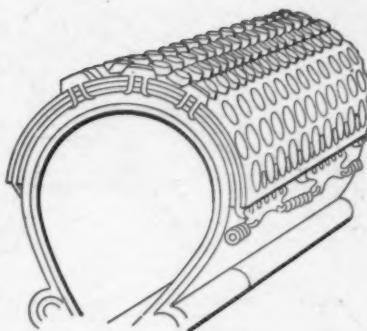
making a specialty. The Doolittle demountable-detachable rim, operated by turnbuckles, which this company recently adopted, is set forth in a comprehensive exhibit. It is one of the cleverest devices of the sort that has yet happened and deserves its remarkable success.

The Hartford Rubber

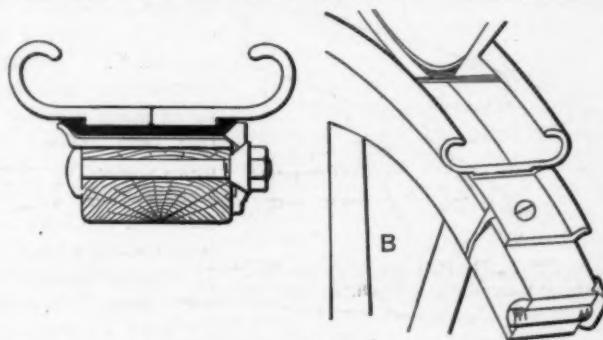
Company, of Hartford, Conn., was one of the first to push the Dunlop style of tire, and still finds a large demand for it, in spite of the competition of the quick-detachables of the clincher style. The Hartford non-skid with the coils of steel spring wire encircling the tread has proved a great success, and now occupies a leading position in the company's output. Its multiplicity of claw-like points prove just the thing for greasy asphalt pavements.

Woodworth tire treads in several styles form the exhibit of the Leather Tire Goods Company, of Niagara Falls, N. Y. These are of leather, steel-studded and are detachable at will. In position they are held snugly against the tire by a series of coil springs along each edge. The Woodworth tire chain is of the usual type, but takes the precaution to interpose between each chain and the tread of the tire a strip of heavy leather, to protect the latter from abrasion.

The anti-skid type featured by the Michelin Tire Company, of Milltown, N. J., is steel-studded, the studs being imbedded



Detachable non-skid treads are featured by the Woodworth, with side springs for tension.

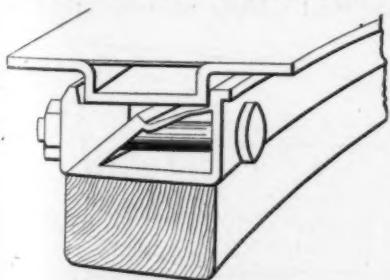


Perspective and cross-section of the Nadall demountable-detachable rim, from Chicago. Note the split clincher rim, which falls apart on the removal of the locking ring.

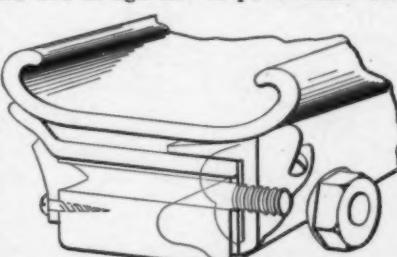
in a leather tread which is vulcanized to the rubber. These rivets, of soft steel, after being turned to shape, are chilled to give a glass-hard surface. The Michelin demountable rim, of the through-bolt type, has been on the market for a comparatively long time. The lugs have a rather thin wedge end which enters well under the clincher rim and gives a strong grip.

Morgan & Wright, of Detroit, have a new non-skid called the "Nobby," which is not slang, but describes the appearance of the tread. Raised oblong knobs encircle it in transverse rows, the rows running spirally with the alternates in opposite directions. The general idea is that often employed on the driving wheels of traction engines; thus the old saying is again proved, that there is nothing new under the sun. Still, the "Nobby Tread" will be found on many wheels next summer.

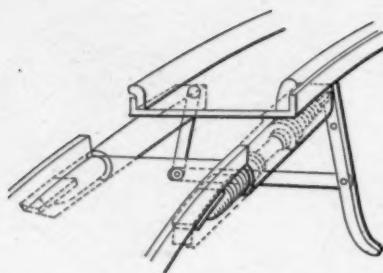
The Motz Clincher Tire & Rubber Company, of Akron, O., is a firm believer in the solid tire as against the pneumatic. The Motz idea is to secure resiliency by providing a deep cross-section for the tire, in which the rubber is cut away just under the tread. Thus, although there is ample wearing surface in contact with the road, the thinner portion provides a sufficient degree of resilience for all uses.



Fisk demountable rim employs a continuous ring as retainer, held in place by bolts.



Demountable rim shown by Diamond, retained by a series of bolted wedge-shaped lugs.



Doolittle demountable rim, adopted by Goodyear, uses twin turnbuckles actuated by one lever.

cup tread, which is provided with a series of rubber knobs hollowed out in their centers. They are claimed to be very efficacious on greasy pavements.

The staggard tread, which was one of the earliest forms of the molded rubber non-skid, is again shown by the Republic Rubber Company, of Youngstown, O. The tire has a series of oval projections in rows running circumferentially of the tread. The rows, some five in number, overlap each other so as to form a surface of continuous roughness. The Republic exhibit shows a number of manufacturing samples illustrating the manner of forcing the rubber into the fabric of the tire in order to secure the permanent union.

The vulcanizers made by the C. A. Shaler Company, of Waupun, Wis., are one of the experienced automobilist's constant companions, and have saved many a dollar in tire bills. They are now made in small sizes suitable for motorcycles, and have also been adapted to the use of electric current for the heating. These latter have an automatic

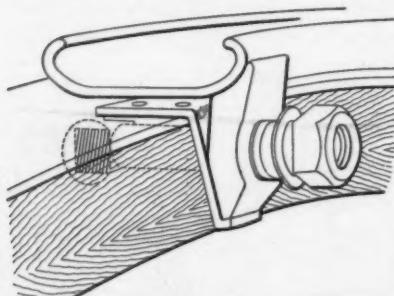
Showing special tool required for the Universal demountable, which has a split rim.

heat control. They are made in sizes adapted both to the garage man and to the private owner.

Native of Chicago is the Nadall demountable rim, made by the Nadall-Van Sicklen Company. It incorporates a quick-detachable scheme which has proved very successful. It is a through-bolt design, with a continuous circumferential ring instead of lugs. The quick-detachable idea is simply the splitting of the clincher rim circumferentially. The two halves are normally held together by a ring of spring steel, but may be easily separated. Then they fall apart and leave the tire absolutely free.

Standard solid cushion tires for clincher rims are shown at the stand of the Swinehart Clincher Tire & Rubber Company, of Akron, O. These are made for all kinds of pleasure and commercial vehicles, and are especially adapted for taxicab service. In addition the Swinehart Company is now marketing a clincher quick-detachable pneumatic tire. The quick detachable rim has a bolted flange which can be operated without any tool except the ordinary wrench.

The "Universal" tire protector, made by the company of the same name at Angola, Ind., is a heavy chrome leather band studded with hardened steel rivets. The protectors are easily detachable, though they



On the Empire demountable rim the retaining lugs do not have to be removed completely.

are recommended for constant use in all weathers, fair or foul. The constant tension devices fitted on these bands are especially neat, and are claimed to prevent creeping of the tread under any condition.

Weed tire chains, made by the well-known New York Company, have a firm grip on the affections of the autoist, as well as on the roads his car travels. For the 1910 product no change was found necessary. The only alteration has been the employment of a special grade of steel which would take the hard surface required by the work without becoming brittle. The Weed line now comprises no less than 76 different sizes.

The Universal Rim Company, of Chicago, is making a demountable rim of the type in which the clincher rim is sawn across, and the ends forced apart in order to remove the rim from the felloe. This is accomplished by an ingenious linkage, operated by a special key and lever; a single half turn of the lever is sufficient either to remove or replace the rim.

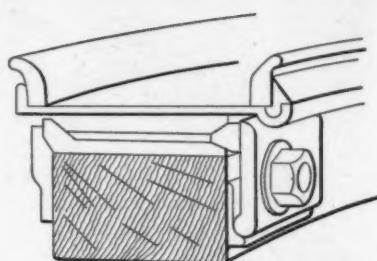
Hard though it may be to pick out any part of the automobile in which satisfactory service enhances the pleasure to be derived from the car,

to the exclusion of other parts, yet most will agree that the tires are the most essential in this respect. It cannot be denied that in the past tires have been the automobilist's bugbear, even more so than ignition and carburetor troubles. The worst thing about a puncture or blowout has always been that it required considerable expenditure of the coin of the realm to set it right, whereas vibrators and auxiliary air valves could be adjusted without expense by the owner.

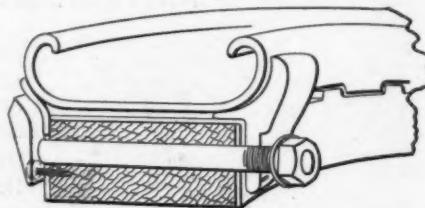
Innumerable attempts have been made to secure a satisfactory substitute for the pneumatic, and, as the descriptions above will show, some of these are meeting with considerable success. Yet the pneumatic remains the standard, and seems likely so to remain. The degree of perfection now reached is evidenced by the guarantees of 5,000 miles service which are made by several manufacturers.

Tires for commercial service are further from the point of finality than those for pleasure vehicles. For the heaviest trucks even solid rubber is often unsatisfactory. Wood blocks, and even aluminum and steel bands are used, though so far without exceptional success. Hardly a month passes without the announcement of some form of spring wheel, but these, too, have failed to secure wide recognition.

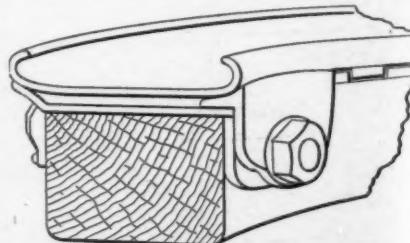
For medium-weight commercial vehicles pneumatic tires are invading fields hitherto the exclusive realm of the solid tire. The invention of the double and triple pneumatic, with two or three tires side by side on the same wheel, after the familiar arrangement of solid tires, has been the cause of this.



Firestone has a quick-detachable rim mounted demountably, of the bolt-retained type.



Precautions are taken by Michelin against creeping of the rim on its base, the felloe, which would shear off the valve-stem.



Retaining lugs of the Continental are neatly shaped and project no more than necessary.

DISTANCE REVOLUTION AND TIME COUNTERS

fostering pride, no matter how justifiable; they serve the business man in the verification of his accounts and the checking of expense accounts to prevent waste.

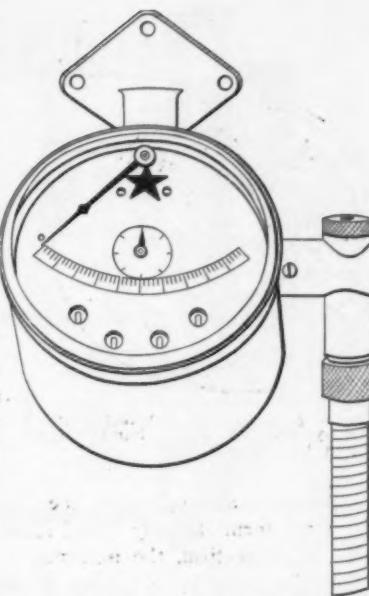
One of the most complete and varied lines offered for the show-goer's inspection is that of the Auto Improvement Company, New York City, which markets its products under the trade name of "Ever-Ready." Odometers, speedometers and clocks are shown in no less than fourteen styles and combinations. The speedometers belong to the centrifugal type, which claims the advantages of being immune to changes from climatic conditions. Neither are they over-sensitive to minor variations; on the contrary, the hand is very steady, at any speed from one mile an hour up. Part of the factory test to which each speedometer must submit before being delivered to the purchaser is a trip of 2,000 miles on the bench.

Three different sizes are made, with dials 2 5-8, 3 and 4 inches in diameter, registering to 50, 60, 70 or 80 miles. The driving shafts are constructed with great care, a steel monocoil being used, protected by a brass, steel-lined casing. The Auto Improvement Company has a special line of clocks built for automobile use, for which it claims many good points. These are sold either separately or in combination with other registering instruments.

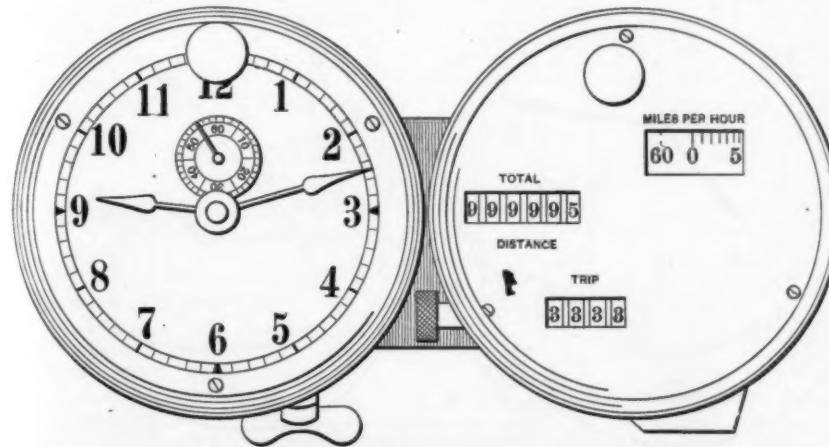
The Hoffecker Company, of Boston, Mass., has on hand its jolting machine to give spectators an ocular demonstration of the steadiness of "the steady hand." A frame is provided, loosely mounted, and with a cam mechanism which gives it frequent and violent shocks; on this is carried a speedometer driven

at a constant speed. The frame jerks about in all directions, yet without affecting the indicating hand of the speedometer. The Hoffecker is offered in three sizes, with 3, 3 1-2 and 4-inch dials, reading to maxima of 50, 60 and 90 miles respectively. With the smallest of these, which sells at a moderate price, a separate season and trip odometer of a well-known type is provided, attached to the outside of the case. The other two styles have a special Hoffecker odometer built in with the speedometer mechanism. This odometer differs from the usual form in that the trip mileage is indicated by a hand moving on a scale concentric with that of the speedometer proper, either inside or outside of it. The figures of the season odometer show through a window in the usual fashion. The Hoffecker operates on the centrifugal principle.

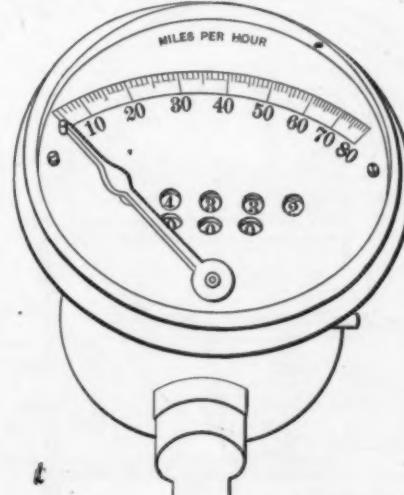
That busy little instrument, the Jones "Live-Map," is exhibited on the stand of the Jones Speedometer Company, of New York City, and attracts as much attention as it did at the two New York shows. The idea is to print the directions for a trip of a hundred miles on the rim of a cardboard disc, and to mount the disc in a frame with gearing to the front wheels in such a manner that it will be rotated at a speed proportional to that of the car. With the proper adjustment, a stationary hand on the frame will then always point to that part of the card which bears the directions for the road which the car is at that moment traversing. This presupposes, of course, that the car follows the route exactly, without side excursions. An adjustment is provided, however, which permits the card to be adjusted at any time to the position the car occupies. The cards are about ten inches in diameter, each bearing directions for a hundred miles of road, and about 600 different ones have been prepared by the Touring Club of America for use in the instrument. The usual line of Jones speedometers is shown, differing in few respects from those of 1909, combined in various ways with odometers.



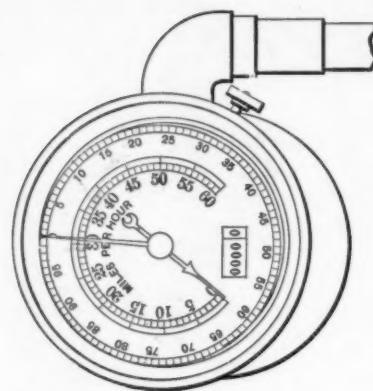
Star speedometer reverses usual arrangement of scale, with pivot at the top end and dial at the bottom.



Neat combination of clock and speedometer-odometer brought out by Warner as a member of the "Autometer" line. The odometer figures read to 100,000 and 1,000 miles for season and trip, and provision is made for electric lighting.



Compact instrument from the Jones factory, with scale reading from zero up to 80 miles an hour.



The trip odometer reading from a scale by an indicating hand distinguished the Hoffecker.

In principle and operation the Stewart instruments do not differ from forms already found satisfactory. The principle, of course, is magnetism, the influence of a rotating magnet on a floating disc held by a spring, which attempts to follow the magnets. These latter, four in number, are imbedded in a ring-shaped rotor driven from the front wheel. They are made of imported tungsten steel, accurately machined. The central stud which carries the rotar receives in turn a spindle, mounted on a jewel bearing, which carries the following disc. Being made of a special alloy metal, this has a low resistance. It is also very light, even in connection with the indicating hand mounted on it, so that the hand moves freely.

Chief among the instruments which sell at a price gauged for the pocketbook of the man of average means is the "Star," the product of the Star Speedometer Company, of Danville, Pa. In appearance it is unostentatious, being in shape cylindrical and set to be mounted at an angle, with the dial on the upper face of the cylinder. The indicating hand is pivoted not at the center, but at the extreme upper and forward edge; it swings over an arc of perhaps 90 degrees on a scale graduated from zero to 50 miles by regular intervals. The odometer mechanism reads to four figures, the figures appearing in windows outside the speedometer scale; there is also a fractional hand, like the second hand of a watch, inside of the scale, reading by eighths.

The low price of the "Star" is claimed to be due to simplified design and modern methods of manufacture. Its gear cutting is done accurately, and the bearings are as nearly free from friction as it is possible to make them. Neither has the external finish been slighted. The flexible shaft drives through bevel

gears into the side of the instrument.

Tachometers, as shown by the Veeder Mfg. Co., of Hartford, Conn., are, in reality, nothing more than what the public is accustomed to call speedometers. Their design depends on the principle of centrifugal force, but in an entirely different application from that commonly seen. The working part is a little centrifugal pump, like that used for circulating water in cooling systems. The liquid which fills the pump and the tube above it does not circulate, however, but is driven more and more completely out of the pump casing the faster the paddle wheel goes round. This action causes the liquid, which is red in color, to rise or fall in the glass tube above the pump, and a scale shows the speed to which the level corresponds.

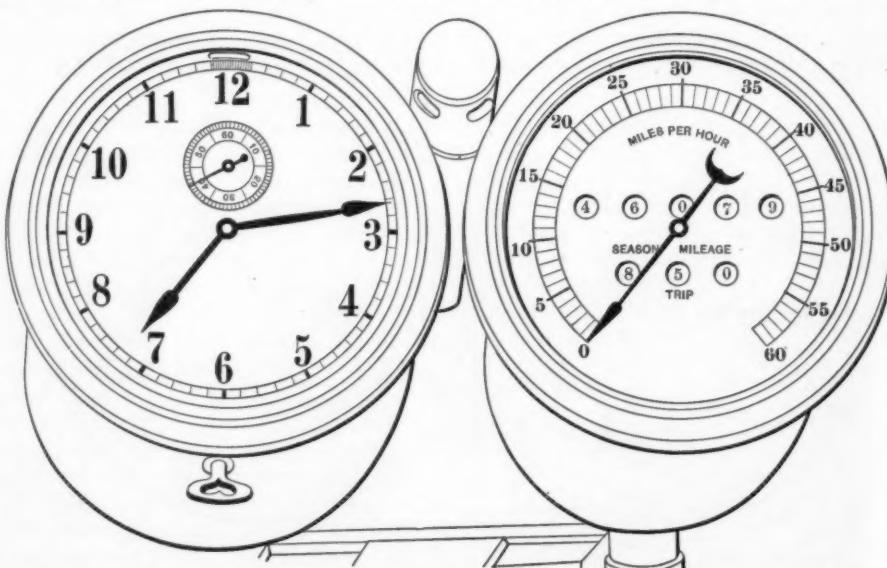
As long as the liquid stands at the zero mark when the car is at rest, the readings must be correct. If any of the liquid should leak out or evaporate, this fact would be indicated by the falling of the level below zero under this condition; it can then be adjusted by means of a small nut.

"Autometers" appear on the stand of the Warner Instrument Company, of Beloit, Wis., both in the form in which they first won the attention of the automobilist, and in the newer form in which they were first seen last year. The mechanism of the two are, of course, identical. Their distinctive feature is the use of a band with figures which appear in turn in front of a window, instead of an indicating hand. It is claimed for this system that it is possible to have a separate figure for each mile an hour of speed, amounting in effect to an indicating scale of many times the usual length.

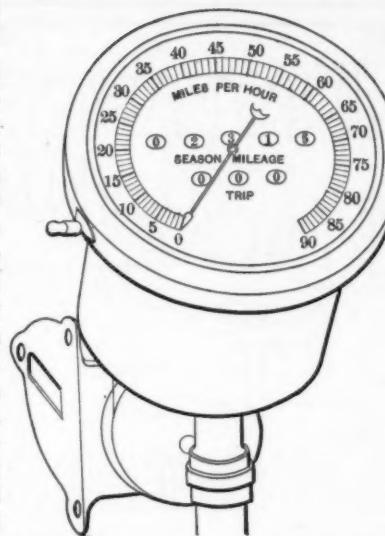
These instruments work on the familiar magnetic principle, the magnet rotating and exerting a dragging influence on the spring-retained band. The odometers shown in combination with the newer forms read to 100,000 and 1,000 miles on their season and trip faces, instead of the customary 10,000 and 100 miles.



Another form of the Jones speedometer, differing slightly from that which was previously shown.



Twin instrument, with clock, of the Stewart Company, working on the magnetic principle; at night the combination may be illuminated by an electric bulb in the central turret, which is provided for that purpose.



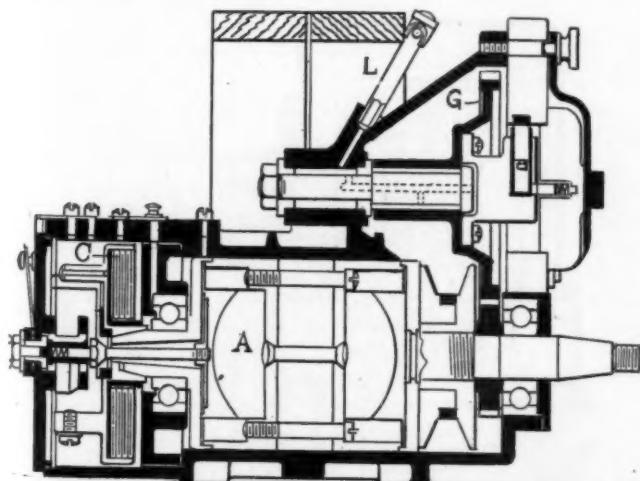
Exceptionally long scale is secured on the Stewart instrument reading up to as high as 90 miles.

MAGNETOS AND AUXILIARY IGNITION SYSTEMS

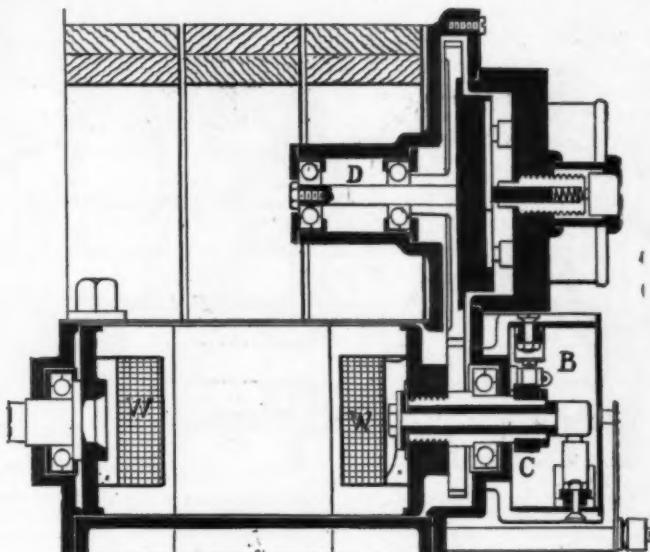
PRINCIPLES of electricity, as applied to automobile ignition, are becoming more widely understood, and there is a corresponding increase in the number of systems offered to the public. Some of these, it is apparent, are the result of much painstaking experimentation, being applications of laws formerly understood only in research laboratories. Others are but new forms of old principles, depending for their merit on mechanical ingenuity and skill in design.

Among the oldest manufacturers of electrical ignition appliances in the country is the Apple Electric Company, of Dayton, Ohio. The regular Apple system employs a dynamo in connection with the storage battery and coil. In fact, the system differs from that which a few years ago was universal, namely, the battery, four-coil and timer system, only in the provision of the dynamo, which in service is constantly recharging the battery.

The Electric Storage Battery Company, of Philadelphia, will exhibit as usual Exide batteries suitable for electric pleasure and commercial vehicles, Exide sparking batteries and Exide lighting batteries. The latter are used, among others, by the Packard Motor Car Company to provide current for the dome lights in all Packard limousines. Exide ignition batteries are offered in two forms; one in the conventional way, with the usual number of cells, wired in series, in a wooden case, and the other with an emergency battery in the same case. The emergency battery is, of course, of the same voltage as the main battery, but has a smaller amperage capacity, being good for but a few hours' continuous usage. This, however, is usually sufficient for the automobilist to reach a charging station. The idea is like the reserve gasoline tank, which is almost universal.



On the Kingston magneto the condenser is mounted concentrically with the armature, just inside of the contact-breaker, thus making the shortest possible connections.

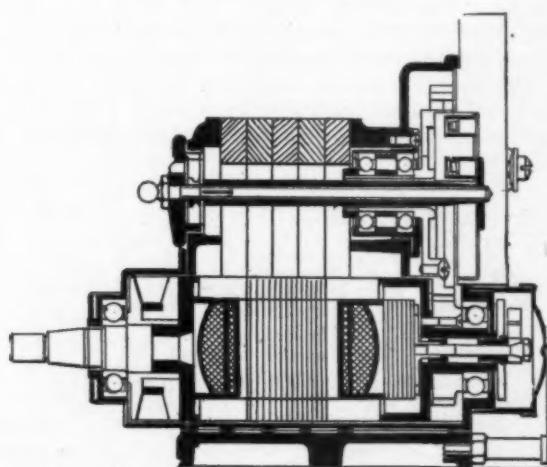


Splitdorf magneto shows thorough use of annular ball bearings, the distance between the bearings on the armature shaft being comparatively short to minimize bending strains on this part.

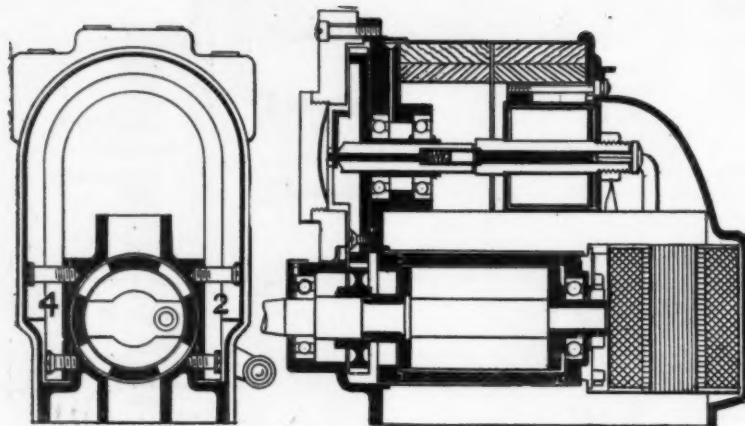
At Chicago, as at both the New York shows, the R. E. Hardy Company, of Detroit, will exhibit, in addition to its line of "Sta-Rite" plugs, a new plug called the "Apropos." The porcelain of this plug, at its business end, is hollowed out in a conical form, through the center of which the electrode projects.

The Seeley ignition system and the Seeley duplex magneto are shown by the High Frequency Coil Company, of Los Angeles, Cal. The 1910 system is identical with that of last year. The electric current, which may come from either a magneto, a storage battery or a dry battery, is led through a non-vibrator coil with a condenser wired in parallel. From this the current goes through a single wire to a roller type of timer on the motor. The timer sends the current to the four cylinders in turn, by way of the resonators mounted on each cylinder. These in external appearance are small cylinders, seated on a bracket close to the spark plugs, to which they are connected by brass strips. Within each resonator are two windings, a primary of three turns, and a fine and dense secondary. The induced high-tension current in the latter in turn bridges the gap of the sparking points.

A complete line of electrical apparatus, and some other kinds, constitutes the exhibit of A. R. Mosler & Co., of New York City. Among these may be noted "Spit-Fire," "Triumph" and "Beat-em-All" spark plugs, "Umph" timers and distributors, Mosler roller timers and distributors, self-snap controlling levers and cut-out levers and "Isti" rear signals.



Complete enclosure is a feature of the Herz magneto, the magnets being set close together and the ends closed in with plates; ball bearings are used throughout on both shafts.

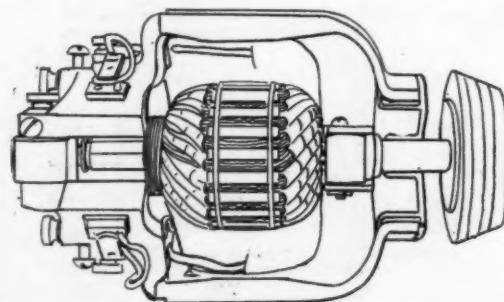


On the Pittsfield magneto the coils in which the high-tension current is induced are mounted just behind the armature, and are always stationary; this arrangement allows them to be better insulated.

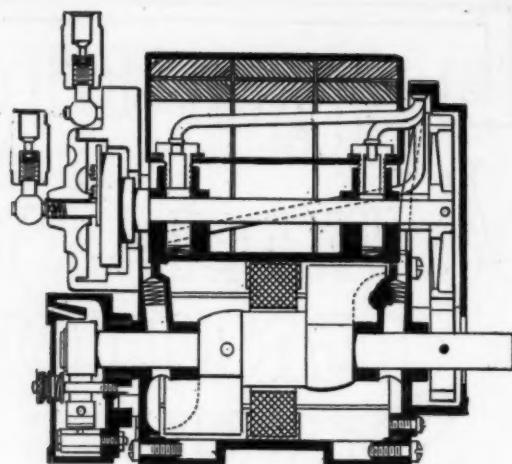
Dry batteries still find considerable favor in ignition, being especially highly regarded as an auxiliary for magnetos. In this line the "Columbia," made by the National Carbon Company, of Cleveland, Ohio, has always occupied a position of pre-eminence. Advantages claimed for these batteries are that they may be replaced at a nominal cost when exhausted, instead of having to be recharged, like a storage battery, which means either the loss of the use of the battery for a considerable period of time, or else the greater investment of two batteries; further, they contain no acid, so will not slop and spill, or corrode terminals, and are water and weather-proof. The particular feature of the "Columbia" line is that these batteries give notice of their approaching exhaustion from 100 to 200 miles in advance of the point where they become useless.

"Monarch" spark plugs and timers are shown in various styles by E. M. Benford, of Mount Vernon, N. Y. The "Monarch" porcelain plug is simple in design, with electrodes projecting well into the combustion chamber. In mica-insulated forms the whole central core projects to meet the grounded electrode. The magneto plug, also mica-insulated, has a core of twice the usual thickness, so that the heat, oil and extreme high-tension current of magneto service can have no ill effect upon it. The insulated electrode has an inner head of crown shape, providing a multiplicity of sparking points wherever the points of the crown approach the cylindrical continuation of the outer shell.

The B. & S. igniter, which is made by the Briggs & Stratton Company, Milwaukee, Wis., is a device designed to replace a magneto, by accomplishing the ignition of an ordinary engine very economically from a set of storage or dry batteries. It is claimed that a four-cylinder engine will show 2,500 miles on one charging of a 6-60 storage battery. The device consists of a complete ignition system designed to be mounted rigidly on the engine base and driven by the shaft ordinarily provided for the timer. This case, 5 inches in height and $3\frac{1}{4}$ inches in diameter, contains a non-vibrating spark coil, a condenser, a positive make-and-break mechanism and a high-tension distributor to the plugs.



Dynamo generation of the ignition current is favored by the Apple Electric Company; the Apple machines are designed to be driven by a friction pulley on the flywheel.



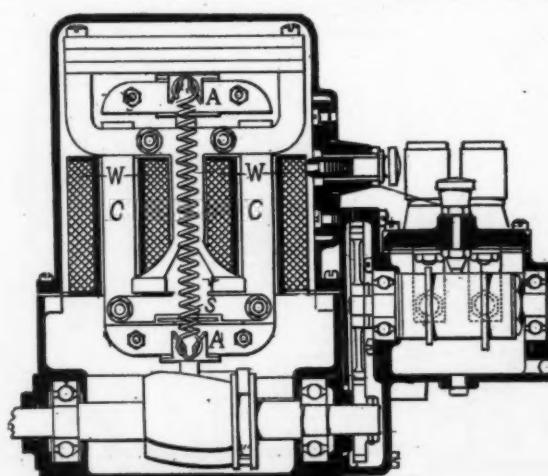
Compactness distinguished the Remy magneto, together with its original form of ball snap terminals for the high-tension leads.

In addition to Kingston coils, switches, timers and spark plugs, the Kokomo Electric Company, of Kokomo, Ind., has brought out for the coming season a magneto, of the standard type, but offering some refinements. Annular ball bearings are used throughout. The armature has a high-tension winding, making the magneto one of the true high-tension type.

"Soot-proof" spark plugs are shown by C. A. Mezger, Inc., of New York City. As this plug has been on the market for some time and is a favorite among automobilists, it is scarcely necessary to state that it still retains its characteristic feature, a long, straight electrode seated in a deep annular chamber, the walls of which form ample insulating surface. Even though the latter should be completely covered with soot or carbon, the resistance of the path thus formed would be so high that the spark would jump between the points in preference.

The chief exhibit at the stand of the Heinze Electric Company, of Lowell, Mass., is the new Heinze magneto. This attracts the eye through the shape of the horseshoe magnets, which are round in cross-section, instead of rectangular—that is, before bending they are rods rather than flat strips. The ends of the magnets are tapered and forced by pressure into correspondingly tapered holes in the pole-pieces, giving a very intimate contact. The armature core is of cast iron, and of the shuttle type, but the slots are not as deep as usual. The winding has fewer turns, also, the claim being that this is compensated for by cutting a greater number of lines of magnetic force on each revolution.

The Atwater-Kent spark generator is shown in a form closely resembling that of 1909, together with the Unisparker, which was new last season. As is well known, the great advantage of this system is its economy of current consumption, but one spark



The Witherbee represents an entirely new idea in ignition devices; it is claimed that it will generate sufficient current for starting by turning the starting crank.

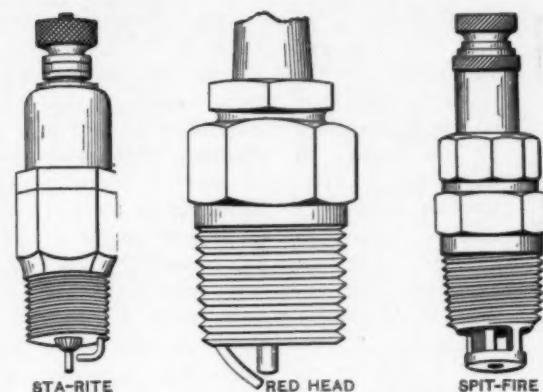
being made for each explosion, instead of six or seven, as is the case with vibrator coils. In the spark generator the whole mechanism is placed on the dash and driven by a positive connection with the cam-shaft of the car; in the Unisparker the contact maker and distributor are placed on the engine, and the condenser and spark coil are placed on the dash, thus doing away with a separate drive shaft.

The complete line of magnetos made by the German firm of Unterberg & Helmle is shown at the stand of the J. S. Bretz Company, of New York City. These are listed in nine sizes, two of which, designed for large motors, are fitted with the special U. & H. spring device, which produces a spark no matter how slowly the motor is cranked. A new form is that adapted for use in dual ignition systems; a special dash coil and switch has been provided for use with it, as the magneto is of the true high-tension type. The condenser is mounted on the end of the armature and revolves with it, so that a number of brushes and other connections are eliminated.

The Connecticut Telephone & Electric Company, of Meriden, Conn., recently announced the addition to its line of a magneto. Attention has been paid to the adapting of the magneto to the understanding of a man of limited mechanical education, such as are more and more to be found in the possession of automobiles. One feature in particular is the provision of a separate spark gap for each cylinder; in case that cylinder is not firing the spark will jump the safety gap and will be visible through a window. Another point aimed at was efficient sparking at low speed, so that it will not be necessary to spin the starting crank in order to start the motor.

Two types of Eisemann magneto are marketed by Lavalette & Co., of New York City. The original Eisemann, which was a low-tension with separate coil, is continued, but there has been added a true high-tension type, with secondary winding on the armature. Both employ pole-pieces of a helicoidal shape, whereby the magnetic lines of force are progressively broken and re-established. A spark advance of 35 degrees has been made possible, the method being the shifting of the steel shoes on which the fiber block of the make-and-break device works. The same company has a dual ignition system, with non-vibrator dash coil and switch, for starting from the seat.

An entirely new magneto for primary ignition is shown by the Motsinger Device Manufacturing Company, of Pendleton, Ind. It is driven by a friction governor pulley and operates equally well



Illustrating three standard types of American-made spark plugs, two being porcelain-insulated and one using mica for this purpose.

in either direction. It generates a direct current, and is intended for use with the regular equipment of spark coils and timer. The familiar "Auto-Sparker" has by no means been superseded, however, being still on the job, and this year capable of a slightly greater amperage output than formerly. It is suited for charging 6-volt storage cells and can carry a load of six tungsten lamps each 6 volts and $\frac{1}{2}$ ampere.

Coils insulated in glass form the exhibit of the National Coil Company, of Lansing, Mich. The effi-

ciency of glass as an insulator is proven by its use in many other situations in electrical engineering where an insulator of great reliability is required. The National coils are claimed to be proof against all leakage of current and cross-induction between coils, thus eliminating one of the most prolific sources of missing, mis-firing, slow action, large fuel consumption and run-down batteries. In appearance these coils differ in no way from standard, the usual hard rubber insulation being simply replaced by glass. This material is naturally of an exceptional quality, to stand the hard service.

The "Never-Miss" spark plugs, guaranteed for one year, are shown by the Never-Miss Spark Plug Company, of Lansing, Mich. These plugs are made in two types, one for magneto use with four grounded points surrounding the central electrode, and the regular design with both points of the projecting wire form. The exhibit includes an auto clock, to be fastened to the steering wheel rim; ammeters, also guaranteed for one year; battery connections, and chain-repair devices to bring together and hold in place the ends of a broken chain.

Simms magnetos, made in England by Frederick Simms, of the original Simms-Bosch Company, are imported and sold in this country by the Simms Magneto Company, of New York City. They are of the standard high-tension type, with secondary windings on the armature. In design they show the results of the long experience of their maker in this line of work. The claim is made for them that with six drops of oil every 10,000 miles they will give continuous and reliable service for hundreds of thousands of miles.

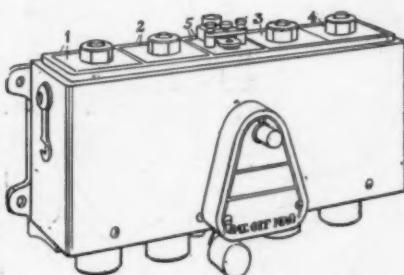
A complete line of storage batteries for electric vehicles is shown by the United States Light & Heating Company, of New York City, whose products go under the trade name of the "National" batteries. This concern has introduced new types of batteries, in one of which the plates are of a medium thickness, while in the other they are very thin. It also shows its new line of high-bridge jars.

Remy low-tension magnetos are shown in two models for 1910 at the stand of the Remy Electric Company, of Anderson, Ind. Both types are of the same design, which is well described pictorially in the illustration offered herewith.

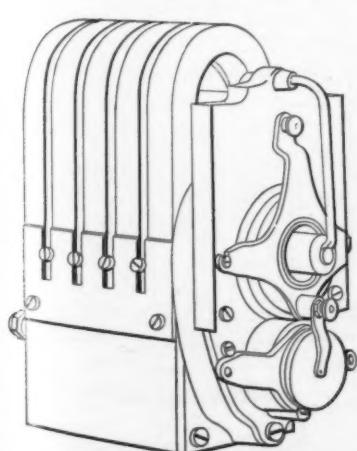
The Vesta Accumulator Company shows storage batteries for lighting and ignition purposes. The former are being made a specialty, in view of the great popularity of electricity as a means of illumination. The Vesta magneto, of the low-tension type, which made its débüt at New York this year, is also on hand. It embodies all the features which have come to be regarded as standard in that type of magnetos which relies on a separate coil for the transformation of the current to a high voltage.

The Witherbee igniter is the latest product of the Witherbee Igniter Company, which started as a manufacturer of storage batteries. Its design differs in many respects from standard, embodying as it does

a very successful effort in the direction of providing a good spark at a very low speed, for easy starting of the motor. The lines of magnetic force are cut by a cam-operated device corresponding to the armature, which however works at a fixed rate of speed.



Master-vibrator spark coil brought out by the Connecticut Telephone Company, which has many good features.



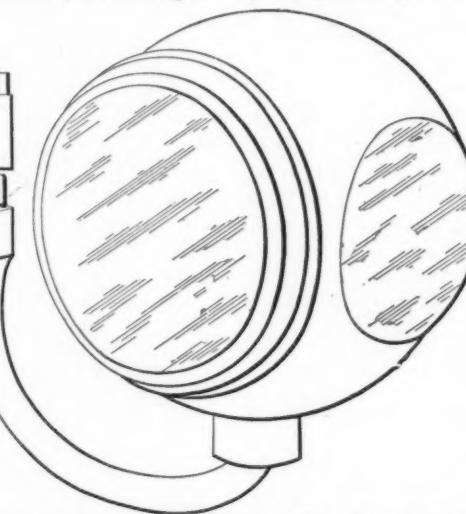
K-W magneto, in which all working parts are of chrome steel, ground and lapped.

ELECTRIC ACETYLENE AND KEROSENE LAMPS

of the Solar, made by the veteran Brass Mfg. Co., of Kenosha, Wis. The body and flare of this lamp are a single piece of heavy brass, and the door is recessed in such a manner that the front reflector is outside the glass. Two forms of eclipsing devices for city driving are shown. The "Solarclip" drops a shutter behind the acetylene jet and the back reflector, and the "Raydeflector" shifts the jet out of focus with the reflector.

R. E. Dietz & Company, of New York City, has five sizes of "Majestic" headlights, with several varieties of side and tail lamps. The line of the company has been much reduced by eliminating patterns which were found not up to the required standard; consequently the whole product is now concentrated on a few of the very best styles. New devices are the result of recent demands, among them the

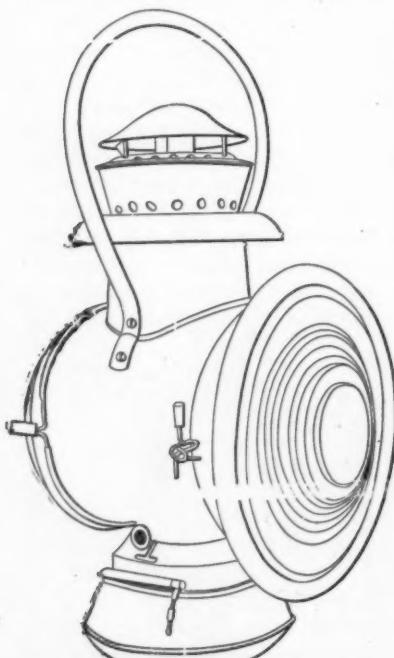
lamp-maker, the Badger



Dietz electric tall-light, in which advantage is taken of electric simplicity to make the shape.

"Presto," for changing from oil to electricity, and "Comet," for changing from oil to acetylene.

Edmunds & Jones, of Detroit, display oil and electric side lamps and combination electric and acetylene headlights. The latter are distinguished in appearance by their rather unusual length. The flare fronts are integral with the cylinder part, giving a smooth surface. The latest E. & J. development is a condensation cup, to catch the water which is often present in acetylene gas and which always causes trouble unless quickly eliminated. The idea is to arrange the piping so that water will drain into the cup, where it will not interfere with the system.

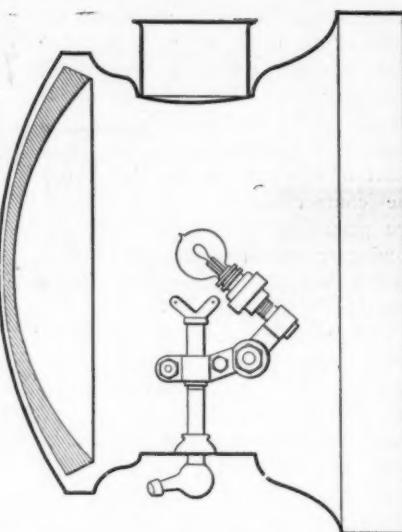


Cylindrical-bodied Ham oil side light, with bull's-eye front lens.

ORNAMENTAL, as well as useful, are the lamps which are now being produced by the leaders in this line. After reaching the nearest possible point to ultimate perfection as light-giving devices, the continued development has been in the line of beautifying the lines and finish.

In simplicity and pleasing though unostentatious effect, one of the leaders is the "torpedo" style lamp-maker, the Badger

The leader in the Gray & Davis line is the close-coupled lamp, which has a very short body. The shortness of the body is said to prevent flickering, as there is no body of useless air in which currents may arise. On the other hand, there is more air above and below the jet, where it is the most use. Another Gray & Davis feature is the patent leather finish, a dull black surface which does not require polishing, yet



Gray & Davis combination acetylene and electric headlight, as an electric.

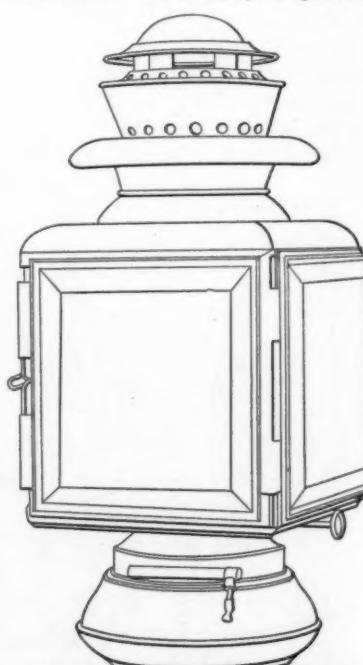
has a rich appearance. A combination electric and acetylene device, very neat in design, forms a part of the exhibit, and seems destined to popularity.

Ham's "Cold Blast" oil lamps, made by the C. T. Ham Company, of Rochester, N. Y., embody features of design which have always secured them a place when the question was one of reliability in light-giving. They are neat in appearance, showing a considerable degree of perfection in design, both from the mechanical and artistic points of view. The doors of the cylindrical body styles are made with bull's-eye lenses of a special design, which is said to greatly enhance their light-projecting qualities.

Two distinct tendencies are to be observed in lamp construction, one of them is the movement toward the uni-

versal use of electricity, means of dimming the projected beams of powerful headlights. The latter has been made the subject of not a few city ordinances, and automobileists who live in the affected districts are tired of compliance by such primitive means as whitewashing the front glass, or pasting in a sheet of brown paper—both are common.

As for electric lighting, the great obstacle is the almost universal use of the magneto for the ignition system. The doom of the battery, even as an auxiliary, was already in sight when electric lighting first became popular. The majority of magnetos are not used for lighting.



Ham square-bodied, oil-burning side light, known as the "Coupé" style.

CARBURETORS AND FUEL ACCESSORIES

FUEL systems are covered in complete by the exhibits, ranging from the gasoline storage tank, through pumps and other distributing mechanisms to the gasoline tank of the automobile, thence through intermediate devices to the carburetors; one new device provides for the further mixing of the gas after leaving the carburetor for the motor cylinders.

The S. F. Bowser Company, of South Bend, Ind., shows its well-known and reliable line of storage tanks and pumps, which have become a standard. These are built to fulfill any requirement for either a public or private garage, providing a safe and convenient storage. The tanks are located outside of the building, and are filled from the outside; the pump, on the contrary, is on the inside, and delivers the required amount of gasoline into the tank of the car without exposure to the air.

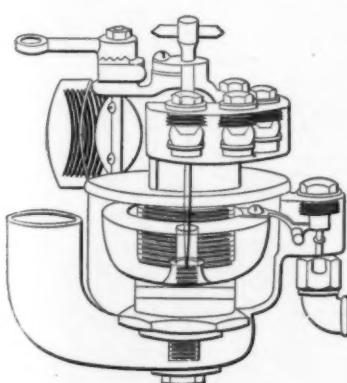
The Breeze carburetor, shown by the Breeze Carburetor Company, of Newark, N. J., is distinguished by such modern features as the venturi-tube suction chamber surrounding the gasoline jet, and the concentric float. The gasoline and air adjustments are both placed on top of the carburetor, the former having figures and graduations stamped on a dial head to indicate its position. The auxiliary air valve is claimed to be noiseless in action, and the longer it is in use the better it seats. The shape of the needle valve, which comes down into the opening of the nozzle, causes the gasoline spray to be broken up into the finest particles. This company also makes a gasoline strainer and various forms of engine connections.

An interesting type of auxiliary air valve may be observed on the Kingston carburetor, exhibited by Byrne, Kingston & Company, of Kokomo, Ind. It consists of a series of ball valves, which the suction of the motor causes to lift in turn, progressively, from their seats. The openings in the seats on which the balls rest are cups or inverted cones of different tapers. The top of the gasoline nozzle forms a cup, the upper edge of which is somewhat above the narrowest part of the chamber.

The clever little device brought out by the Gasoline Motor Efficiency Company, of Jersey City, N. J., under the trade name of "Homo," is favorably staged. This device, it will be remembered, is intended to be inserted in the inlet pipe between the carburetor and the motor. It consists of a screen of coarse wire mesh, behind which is a ball-bearing fan. The passage

of the stream of mixture causes the fan to rotate and break up the particles of liquid gasoline, thus assuring a uniform gas charge.

The Bowers carburetor, an unusually simple and compact device, is exhibited at the stand of the Gilbert Mfg. Co., of New Haven, Conn., successor to the F. E. Bowers Company. Like many other carburetors of recent date, the Bowers embodies the venturi-tube suction chamber and the concentric float. The compact



Kingston carburetor, showing row of ball valves for auxiliary air.

appearance is due largely to the fact that the supplementary air inlet is concentric with the main air inlet. The venturi-tube has a conical-shaped piece inserted in its lower end, surrounding the jet, through which the main air supply enters. The auxiliary air comes in around this central piece and joins the central stream in a mixing chamber above the jet. The shape is such that a whirlpool effect is created in the chamber.

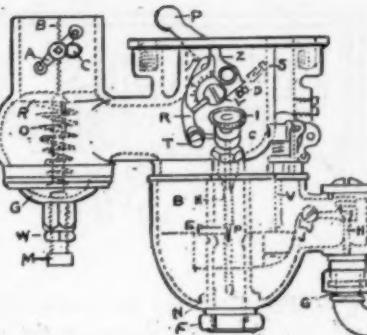
The Holley Brothers Company exhibit the carburetor bearing their name in several forms, all of which are more or less familiar to the public. This company will be remembered as the first to utilize the venturi principle as the exclusive means of proportioning the air supply to the gasoline, and also as the originator of that type known as the "puddle" carburetor, in which at low motor speeds the mixture is by evaporation from the surface of a puddle of gasoline, rather than by a spray. One of the forms offered to the public is the original of this type, in which the float chamber is concentric with the jet, and the automatic air valve is eliminated.

A. R. Mosler & Company, of New York City, show a carburetor known as the M & B, a small and light device with a concentric float. The air passages appear to be in the shape of a letter T, the vertical stem being the main air passage, surrounded by the float chamber and having in its center the gasoline nozzle. One of the arms of the T has the auxiliary air valve in its end, and the other forms the outlet for the completely mixed gas. A butterfly throttle valve is regularly provided at this outlet. The auxiliary air valve is adjustable by means of an easily operated wing nut. The needle valve screws down on the jet from above, and is provided with a graduated nut and spring stop.

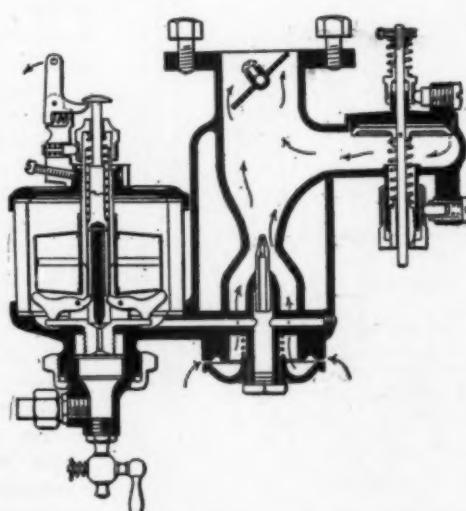
The Stromberg Motor Devices Company appears in its home show with a complete line of carburetors of two types, in one of which the float is concentric and in the other located by the side of the mixing chamber. The latter form provides an ample water jacket surrounding the mixing chamber, to compensate for the loss of heat incidental upon vaporization. The transparent glass float chamber, which gives these carburetors such a distinctive appearance, is naturally continued.

Four styles of the Schebler carburetor are shown on the stand of Wheeler & Schebler, of Indianapolis. All of these have concentric float chambers.

In three of the styles the air passage traverses the float chamber in the shape of a letter L, with the jet at the angle. In the fourth type the main air passage is straight and vertical, slightly strangled at the jet to secure a venturi-tube effect. The jet comes into this passage at an angle, with an overhead valve.



Latest model of Schebler carburetor, retaining original features.



Stromberg carburetor, with glass float chamber and venturi tube.

MOTORS TRANSMISSIONS STEERING GEAR AND PARTS

SUFFICIENT for the manufacture of a complete automobile are the parts shown by the assemblage of manufacturers in the galleries of the show buildings. From the motor, gears and axles, down to the smallest and least important accessories, everything needful is there. Crankshafts, cylinder castings and axle forgings appear in the rough, and as finished and assembled into their respective units.

Chains as a method of transmitting power have many advantages which have by no means been lost sight of by automobile manufacturers. They are more efficient than any other known method of transmitting power between parallel shafts, and far superior to any of the methods of transmitting between shafts at an angle. Apropos of which is the exhibit of the Baldwin Chain & Mfg. Co., of Worcester, Mass., which is exclusively devoted to chains and sprockets. A new form of quick-detachable link is featured.

The shipbuilding firm of William Cramp & Sons finds many customers among the automobile builders. It specializes in several alloys of the brass and bronze genera. Parsons white brass is almost a standard for crankshaft and other heavy-duty bearings. Manganese bronze, either in ingots or castings, is also furnished by this company; the castings include many intricate shapes, such as crankcases, gear cases, and front and rear axles.

The Diamond Chain & Mfg. Co., of Indianapolis, is another upholder of the chain as a transmitter of power. The company is very proud of the fact that its chains were selected for use on the Wright aeroplanes, in which they are used to connect the motor with the two propellers.

The Driggs-Seabury Ordnance Corporation, of Sharon, Pa., is preparing to furnish forgings and stampings for crankshafts, connecting rods, axles and frames of various qualities of steel, and in any stage of finish.

Die-cast babbitt bushings are exhibited by the H. H. Franklin Mfg. Co., of Syracuse, N. Y., the maker of the Franklin automobile. These bushings are used throughout the Franklin, and have given such satisfactory service that the company established a special department to make and sell them to other builders.

In the line of steering gears the product of the Gemmer Mfg. Co., of Detroit, comes near to the standard. These gears are simple and not over-expensive, and at the same time are strong enough to insure safety in this vital part of the car.

"Imperial" compression couplings are shown at the exhibit of the Imperial Brass Mfg. Co., of Chicago, in a multiplicity of sizes and styles. They are of the cone type, and offer many advantages for automobile use.

Steel tool and battery boxes are the product of the Globe Machine & Stamping Company, of Cleveland. They are specialized for the various demands of an automo-

bile, one being just the size to hold a gas tank; others are fitted with treads for steps.

The exhibit of the Elite Mfg. Co., of Ashland, O., is made up of various styles of "Ohio" jacks, the latest being a new-style ratchet, which is claimed to have only one-half the usual number of parts. The lifting bar can be dropped instantly.

Three distinct styles of "Long Distance" radiators are on the stand of the Long Mfg. Co., a Chicago firm which has attained prominence in this line. One of these is a vertical tube design, and the others are of the cellular persuasion.

McCord tubular radiators are seen in good company. The vertical tubes are closely united with the horizontal sheets which form the body of the radiating service, so that both form a rigid mass. The exhibit of the McCord Mfg. Co., a Detroiter, includes oilers, radiator fans and gaskets, all of which find a wide use among automobile manufacturers.

Auto Cle wrench sets appear on the stand of the Motor Parts Company, of Plainfield, N. J. These sets, which are well known to automobilists, consist of sockets of various sizes, all fitting a single universally-jointed handle, which can be operated through the most tangled maze of pipes.

The pioneer jack company, the Oliver Mfg. Co., of Chicago, shows its improved "Peerless" jacks, which are now made so that the handle can be used as a tire tool or a hammer. The jacks work with equal ease in either direction.

Sager equalizing coil springs, which are a form of shock absorber, form an interesting exhibit at the stand of J. H. Sager & Company, Rochester, N. Y., together with bumpers to protect the lamps and radiator.

Dust-proof and oil-tight, the Spicer universal joints shown by the Spicer Universal Joint Mfg. Co., of Plainfield, N. J., have found a wide employment on modern automobiles.

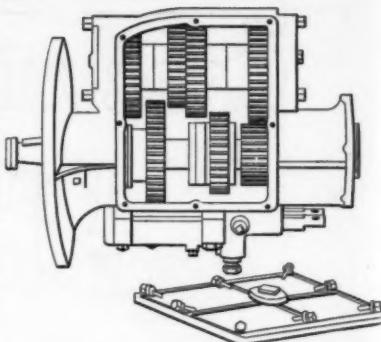
Rims of the suitable cross-section are one of the requisites in securing satisfactory tire service, so it is not likely that the up-to-date manufacturers neglected the stand of the Standard Welding Company, of Cleveland.

Whitney chains, made by the Whitney Mfg. Co., of Hartford, Conn., are especially adapted to commercial vehicle work, and the maker is vigorously pushing them in that line.

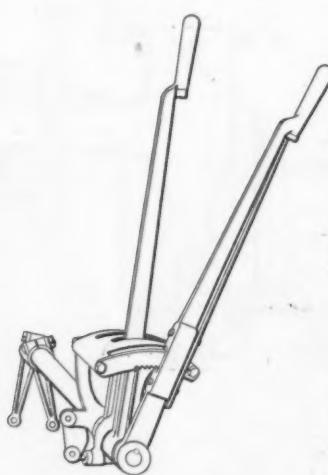
J. S. Bretz & Company, of New York, in addition to U. & H. magnetics, shows a full line of F. & S. ball-bearings, a German make which is widely used on both sides of the Atlantic. The bearings are made with single or double rows of balls, and also in a special type for magnetics for all purposes.

Standard roller bearings are shown both separately and combined in rear axles of various types, by the maker, the Standard Roller Bearing Company, of Philadelphia.

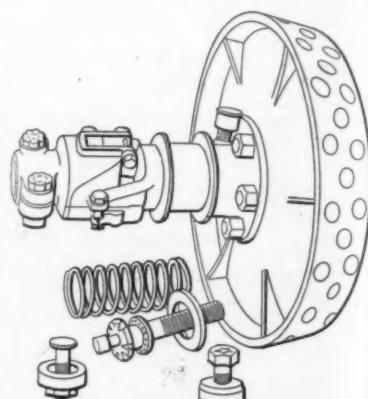
The Timken-Detroit Axle Company and the Timken Roller Bearing Company, of Canton, O., both show Timken roller bearings, separate and in axle forms. A specialty is the short type of bearing, which can be used in place



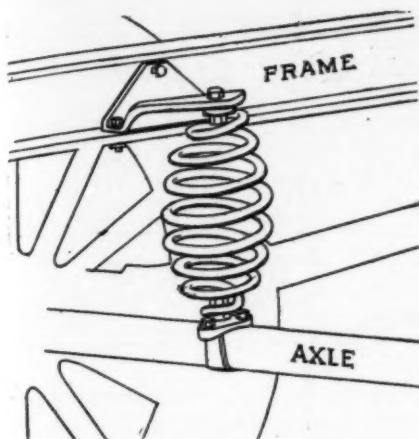
Three-speed selective type of change gear for rear axle unit construction.



Selective gear and brake levers made by the Warner Mfg. Co.



Cone clutch with cork inserts, product of the Auto Parts Mfg. Co.



Coil springs attached between the axle and frame, as used by Sager.

sizes, rated at 30, 50 and 60 horsepower, by the Continental Motor Mfg. Co., of Muskegon, Mich. All are four-cylinder models, with cylinders cast in pairs, and have a very neat pump system of lubrication.

Neat in appearance, the product of the Excelsior Motor & Mfg. Co., of Chicago, attracted favorable comment. It is a four-cylinder motor 41-8 by 51-4 inches, with a multiple-jet carburetor and a pump system of lubrication.

The Muncie Gear Works, of Muncie, Ind., shows a two-speed and reverse planetary gear in combination with bevels, differential, and a jackshaft suitable for use on motor buggies.

The Warner Mfg. Co., of Toledo, O., has a line of change-gears of all kinds, making a specialty of the rear axle type for unit construction. Differentials and steering gears are also shown. The Warner Gear Company, Muncie, Ind., is offering a full line of transmission gears, steering equipment, and parts. The plant of this company is one of the sights of Muncie, and many of the assemblers of automobiles of fine characteristics look to this concern for the very equipment which is at the bottom of the quality which is favorably commented upon.

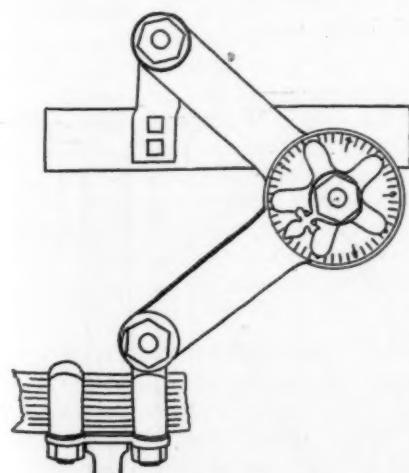
Hartford shock absorbers of the friction-plate type are exemplified by two model automobiles each about two feet long, which seem to be traveling over a very rough road. One of them bumps and one does not; the conclusion is obvious.

The H. & F. Mesinger Mfg. Co., of New York, has a combination strap and coil-spring shock absorber which has the merit of being simple and inexpensive. The company's inside blow-out patch is also shown.

Flat-leaf springs in both the customary types and in a patented form are exhibited by the Perfection Spring Company, of

Cleveland, O. The patented form is a double semi-elliptic spring, with the ends connected by a special form of linkage.

This company, in addition to its special product which is known as the Perfection Spring, is a large producer of every type of springs as used in the suspension of chassis frames. The plant is fitted out with all forms of heat-treating equipment, by means of which vanadium steel and the special forms of Krupp steel are



Hartford friction-plate shock absorber, a pioneer in this line.

of the annular ball-bearings, and is made in the same sizes. This is finding much favor for change-gears, where the space is limited.

The Brown-Lipe Gear Company, of Syracuse, N. Y., shows a line of change-gears, steering gears and differentials which is familiar to all automobilists. Its spur and internal gear differentials have long been a standard.

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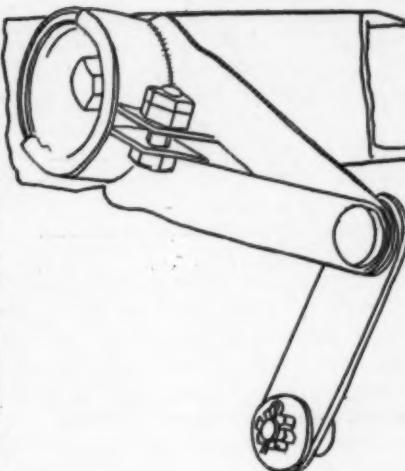
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made into springs such as are employed on some of the most exacting designs of cars which are now to be had. In a review of the spring and shock absorber situation as it obtains this year, it would be most incomplete without calling attention to the high character of the materials which are used in comparison with some of the products of even a year or two ago. When shock absorbers were first introduced, the idea was carried out in conjunction with most frail castings, insecure fittings, and methods sidering the situation as a whole.

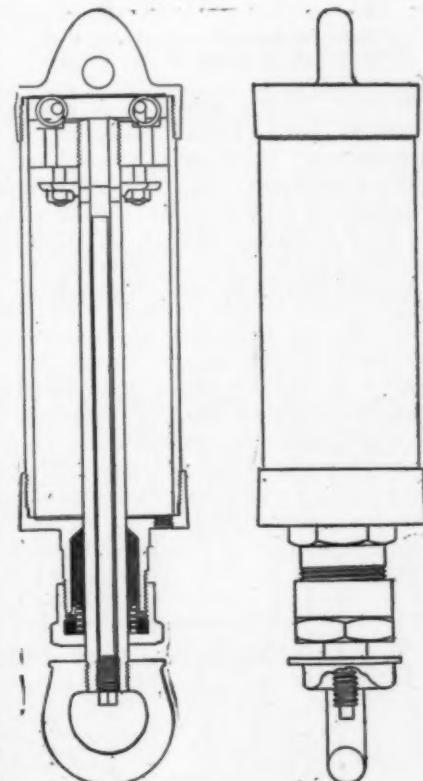
Ernest Flintje's glycerine-filled shock absorbers, hailing from Cambridge, Mass., are as usual much in evidence. They take the eye of the technical sharps, to whom the liquid compression principle is especially pleasing.

At this time, in a review of the situation as a whole, it is enough to say that the shock absorbers are well designed, materials used are capable and the methods of fastening to the side bars and to the axles are in keeping with the better understanding which accompanied experience. The principles which are employed in the designing of shock absorbers may be subdivided: (a) friction types, which set up a drag and dampen the oscillations of the moving mass (b) dash-pot types, which increase the dampening effect with the speed of acceleration of the moving mass, and (c) spring check types, in which the retarding influence is increased in proportion to the distance of travel.

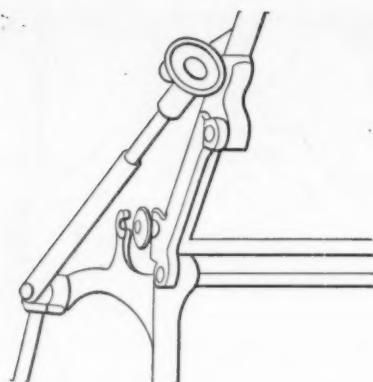
Experience is the best teacher, hence discussions in relation to the relative merit of the respective types are likely to result in far-fetched conclusions, particularly when account is taken of the details in the application of the shock absorbers. It is very likely that failure is courted when any type of shock absorber is promiscuously applied, and it is undoubtedly true that the problem demands specific treatment in order that the particular applications will be in full accord with the especial requirements in every case. Many makers of automobiles realize that shock absorbers are capable of prolonging life of the members which make up a car.



Friction-band shock absorber known under the trade name of Foster.



Glycerine-filled cylinder with piston, the Flintje shock absorber.



Locking device of Sprague windshield, with nut for upright position.

most hardened automobilists, is nevertheless essential to the comfort of many less accustomed to facing the wintry blasts. Modern windshields are designed to fit the appearance of the cars they are to be used on, and so are not the unsightly excrescences of former days, bristling with rods and knobs. Simplicity is now the keynote, and no great mechanical skill is required to change the shields from one position into another.

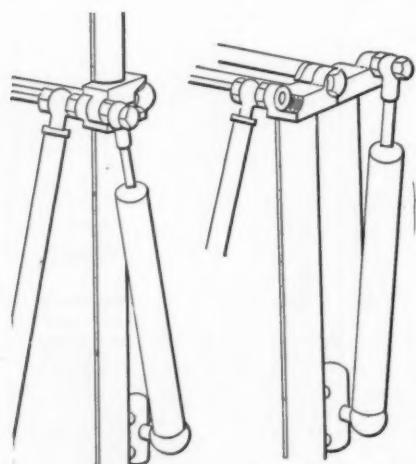
Eight or ten different styles of shields are marketed by the Chicago Wind Shield Company of Chicago, and these differ in many respects. One of these embodies very neatly the compound folding movement, which allows the upper half to move up and down very nearly parallel with the lower half, so as not to interfere with the steering wheel. When folded, it locks firmly both at the top and at the bottom.

In the moderate-priced division the offering of the

Fellwock Auto & Mfg. Co., of Evansville, Ind., is particularly notable. It is a divided shield, folding, and simple and neat in appearance. The frame is of wood, which will please those who like a substantial air. The design shows a desire to build a strong and reliable shield, without undue frills.

An automatic windshield, the upper half of which can be set at any desired angle, is marketed by the Garage Equipment Company, of Milwaukee, Wis. This feature is secured by a friction-plate hinge. To change the angle it is only necessary to loosen two wing nuts, one at each end of the hinge. The lower half can also be folded to the front, so that the whole shield can be swung down over the hood, out of the way.

Three automatic types are exhibited by C. A. Mezger, of New York. On the newer types retention is by a spring enclosed in a telescoping tube, 5 inches long and 3-4



Hydraulic windshield, made by Emil Grossman, New York.

WIND SHIELDS

inches in diameter. The spring works only when the upper half is within about two inches of either its upper or lower position; during the remainder of the swing the shield is prevented from moving rapidly by the friction between two smaller tubes enclosed in the large one. A third type is the friction automatic, which has no spring.

Sprague's tops and windshields, made by the Sprague Umbrella Company, of Norwalk, O., are shown in a number of interesting styles. In all of these it is evident that the object has been to secure a substantial construction which would stand the hard knocks a shield is sure to get. The locking devices are firm and free from complication.

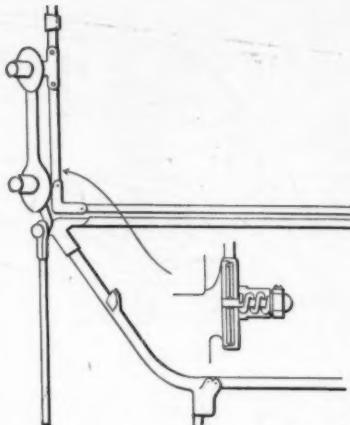
The Sextette automatic windshield is shown by the Troy Carriage Sun Shade Company, of Troy, O. This shield is distinguished by the large number of graceful and convenient positions which it can be made to assume. The hinge contains two discs, one of them with a single corrugation, the other with two grooves, into which the corrugation fits. A spring forces the two discs together, thus locking the shield by the friction.

Noiselessness is claimed as the strong point of the Vanguard shield, made by the manufacturing company of the same name at Joliet, Ill. The shield is divided, with very narrow, almost invisible, brass molding along the edges. The hinge is a double-radius one, so that the upper half can swing without interfering with the steering wheel. The frame is of wood, of selected material, and the brass fittings are very substantial.

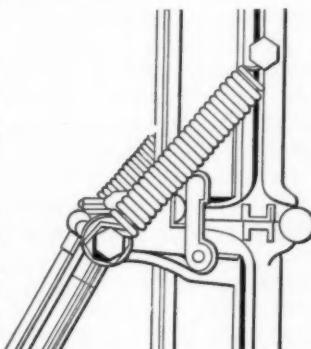
"Vesco" windshields, as exhibited by the maker, the Vehicle Top & Supply Company, of St. Louis, show several models, all at reasonable prices which will bring them within the reach of the man of moderate means. Especial care has been taken to adapt these shields to the appearance of the cars on which they are to be used, with happy results.

The simultaneous activity of a number of inventors seems to have brought the windshield situation close to finality, for it is hard to see how a majority of the designs shown could be improved on. Complication has been reduced to the minimum, and appearance and construction are all that could be desired.

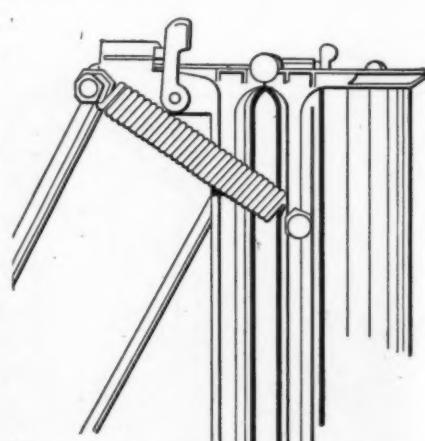
Noise, which emanated from windshields, due to their poor construction, is now absent.



Troy windshield, showing the hinge giving parallel motion.



Standard automatic windshield (Mezger) in upright position.



Standard automatic windshield folded, with the spring exposed.

AUTOMOBILE LUBRICANTS AND DEVICES

motors has the lead by a neck. Nonsense creeps into lubricating discussions about as plentiful as sand floats into bearings, as it is borne on the breeze of passing automobiles, and, as a general rule, talk about the ills of the color or changing viscosity of lubricants, takes up so much space that there is none left to discuss the really important matters.

It is a little strange that an autoist of accentuated intelligence, due to a university education or the hammer blows of actual experience, will smear a little sand on the seat of a valve, grind for five minutes, and, by the simple process involved, take off 1-32-inch of the metal, bring the faces to an even bearing, make the valve tight under great pressure, and then claim that the lubricating oil used in the journal boxes of the motor and other parts is inferior, just because the same results are obtained, in about the same time, the only difference being that the bearings are ground in instead of the seats of the valves.

The ground glass, which is used in the valve-grinding process, differs but slightly from the silicon which creeps into the bearings, and even into the combustion chambers of the motor's cylinders, and, unfortunately, the grinding process, considering the bearings, goes on continuously; valve grinding, on the other hand, is an occasional process.

Even the blue above, referring to the sky, is due to dust—it is so fine we fail to see it excepting when a beam of light crosses the line of vision in such a way as to effect the end. A globule of water is so relatively large, when compared with a particle of dust, that the water would compare as the Sun of our Universe, alongside of the Moon which circles around Earth for the purpose of tolling off the thirteen months in an Indian's year. A bearing may be absolutely water tight and be wide open to dust-wear; due to the presence of this dust, is the same wear that makes it possible to grind in a valve.

The usual rule is, if a bearing squaks, give it a drink. The road to long life of a bearing is, do not let it squeak. Noise, while it denotes a condition of eminent danger, is also evidence of previous neglect. How much damage a bearing may have suffered before the noise became noticeable, is difficult of surmise, but it is safe to say that it is in the nature of permanent damage which no amount of "flooding" with oil, will eliminate.

When a golden eagle is coined at the mint of the Nation, and it takes wings of flight, if it rests for a time in the cavern of a man's pocket, jingling against a bunch of keys, it will not have to be given theroid tablets for the purpose of reducing its avoirdupois; it will be diminished in intrinsic value by the contact, and, being money, the loss will be noticed and subtracted from its value. When bearings are subjected to the same jingling process, as they will be if lubricant is not fed to them, they, too, will depreciate, and the loss will have to be counted in dollars.

WHAT IS THE PURPOSE IN OILING BEARINGS?

An academic statement of fact would read like this: "Oil forms a film over the bearings surfaces, floats the spindle, prevents the same from making contact with the bearing brasses, and, instead of the brasses wearing, the oil wears out instead—oil is cheaper than bearings."

If disappointment is to be avoided, if bearings are to last for

long, and if depreciation is to be abandoned for the most part, it is necessary to assign to lubricants a sterner part. The first duty of a lubricant is to float the spindle and take the brunt of the work; to this must be added the duty of "sealing" up the journal sufficiently to exclude dust.

If there is a sufficiency of the lubricant present, that is to say, if there is a sufficient pressure behind it, and it feeds through the bearings, and out, it will, on its outward migration, float all the incoming dust, and this mischievous foreign matter, suspended in the stream of outgoing lubricant, will be prevented from making a mud pie under the spindle, where, if it is allowed to remain, it will grind the life out of the bearings.

Apparently, according to this reasoning, only liquid oil under pressure, is available for the purpose. The conclusion is ill-advised; grease is a most perfect seal for a bearing; it smears over the bearing surfaces adequately in view of the prime requirement, and the pressure which it sustains, acts as a pump, so that the excess exudes from the bearings, but, being thick and viscous, it remains around the rim, so to speak, most effectually blocking the way of any foreign substance which is knocking at the door for admittance.

There are one or two other points about solid lubricants which get mixed in the process of reasoning; some say it must be heated before it will enter bearings; they do not seem to understand that every bearing is capable of acting as a centrifugal pump. When any mass is rotated, it acts as a centrifugal pump, obeys all the laws of the same, and due to this the grease is pumped in, that is, pressure is accumulated, and the grease, in response to this pressure, follows the bent which we so aptly call pumping. Grease has one property which is to its advantage; if it is sluggish in its action during the process of pumping in, it is equally sluggish in its action after it gets in—it is likely to stay in.

Bearings, when they are cold, are less efficient than when they are warm; this is due to several phenomena:

(A) The amount of energy in the form of heat, which will be lost, will be in direct proportion to the difference in temperature between adjacent walls.

(B) The resistance to shear of the section of the lubricant will be greater as the viscosity of the lubricant is increased; viscosity increases as the temperature lowers.

The condition (A) is difficult of explanation; so long as there is no difference in temperature, it matters not at all as to the prevailing temperature, and yet, as has been definitely established, a cold bearing is less efficient than one which is working at a somewhat higher temperature.

There is one more point which will stand the light of calm discussion; all grades of lubricating oil come from the same well (barring differences in quality of crude oil from the different sections), and it is quite possible for a man of skill in the process, if he is provided with suitable facilities, to make all the grades of oil which can be evolved, and he must face a waste (as a by-product) unless he does utilize, in some way, the entire product of the well. Under the circumstances, and, in view of the basic considerations, it is almost futile for a rank outsider to discuss the respective brands of lubricating oil, for the purpose of fixing upon the quality; it is the skill of the man who does the work that lies at the bottom of the difference. Honesty of the distributor is a great factor, and a concern with a reputation at stake, has much to lose by substituting inferior goods—let us adore the oil-god who will be consistent rather than the fly-by-night who is insistent.

EXHIBITORS OF LUBRICANTS

Cook, Adam, Sons, New York.
 Dixon, Joseph, Crucible Co., Jersey City, N. J.
 Hancock Mfg. Co., Charlotte, Mich.
 Harris, A. W., Oil Co., Providence, R. I.
 Havoline Oil Co., New York.
 McCord Mfg. Co., Detroit, Mich.
 N. Y. & N. J. Lubricants Co., New York.
 Randall-Falchney Co., Boston, Mass.



As the Guests and Hosts Appeared at the Eleventh Annual Banquet of the Automobile Club of America, January 31

CONSIDERABLE POLITICAL TALK AT A. C. A. BANQUET

THE Eleventh Annual Banquet of The Automobile Club of America of New York was held at the Waldorf-Astoria Monday evening, January 31st. It was unusually well attended, about 480 members and guests being present, divided into forty regular tables, besides the President's table and two press tables.

Miniature models of flying machines were suspended with pleasing effect above the tables.

The head table was honored by the presence of Hon. Elbert H. Gary, President of the Club; Rev. Wilton Merle Smith, D.D., Chaplain of the Club; Major-General Leonard Wood, U. S. A.; Hon. Lawrence Y. Sherman, Lieut.-Governor State of Illinois; Rear-Admiral Joseph B. Murdock, U. S. N.; Hon. Charles A. Towne, Ex-U. S. Senator from Minnesota; Col. John Jacob Astor; Hon. Archibald R. Watson, Corporation Counsel, New York City; Hon. J. B. R. Smith, Commissioner of Motor Vehicles, State of New Jersey; Hon. Frederick A. Bugher, First Deputy Police Commissioner, New York City; Hon. William F. Baker, Police Commissioner New York City; Hon. Warren W. Foster, Judge General Sessions, New York County; Hon. Martin J. Keogh, Justice Supreme Court, State of New York; Cortlandt Field Bishop; Hon. Martin W. Littleton; Hon. Charles F. Moore; Colgate Hoyt; Frederick D. Underwood; George F. Chamberlin; Glenn H. Curtiss; William C. Brown; William H. Page; E. Rand Hollander; Schuyler Skaats Wheeler, Albert R. Shattuck and Cornelius Vanderbilt.

After the usual Waldorf banquet menu had been served,

President E. H. Gary introduced the following after-dinner program:

1. "Motive Power"—Hon. Lawrence Y. Sherman, Lieutenant-Governor of Illinois.
2. "The Effect of the Automobile on the Conscience, Pockets and Morals of the People"—Hon. Charles A. Towne, Ex-United States Senator from Minnesota.
3. "The Ideal Relation Between the Man Who Rides in an Automobile and the One Who Walks"—Hon. Martin W. Littleton.
4. "A Historian's Views as to the Future of the Automobile"—Hon. Charles F. Moore.

The Hon. Lawrence Y. Sherman, in the pose of a second Abraham Lincoln, announced his lack of knowledge of motor power, but was particularly well posted on general politics. He was followed by the Hon. Charles F. Moore, who was able to compare the political machine with an automobile in that both are given to inflation, free rides, and are started by a crank. His machine of the future will travel with equal facility on water, in the air or on land without roads. It was certainly a brilliant prophecy. The Hon. Martin W. Littleton disgressed on the increased cost of living, characterized the automobile as a sporadic device of the devil, and stated that the two he owns would not make one. The tables were badly deserted when the Hon. Charles A. Towne addressed the gathering, and at the close the impression was of an entertaining political meeting rather than an inspiration, following a great automobile event.

COBE AGAIN HEADS THE CHICAGO A. C.

Ira M. Cobe has been renominated for the sixth successive year for the presidency of the Chicago Automobile Club, of which he was one of the founders. It is expected that this nomination is equivalent to an election.

The administration ticket follows: For president, Ira M. Cobe; for first vice-president, T. N. Koehler; for second vice-president, T. J. Hyman; for secretary, C. A. McDonald; for treasurer, G. S. Whyte; for directors, F. W. Blocki, Claude Seymour, B. B. Johnson, Allan S. Ray, J. F. Gunther and Harry Vissering.

BUSY RACING SEASON FOR INDIANAPOLIS

E. A. Moross, director of contests at the Indianapolis Motor Speedway, announces the following racing dates as arranged for the Indianapolis track, these to be held under the sanction of the American Automobile Association: The track will be opened with a three-day meet on May 27, 28 and 30. May 30 is Decoration Day, and the races on this day will be under the direct auspices of the A. A. A. in the form of a national meet. The second event at the speedway is scheduled for July 1, 2 and 4. On August 3 and 4 the twenty-four-hour race will be held.

FORECAST OF ST. LOUIS SHOW

St. Louis, Mo., makers and dealers look forward to a very comprehensive show of motor cars which will be held in that city, February 14-19. Eighty-four makes of cars will be shown by 63 dealers or manufacturers, and several car loads of automobiles will be shipped direct from the Chicago Show.

The accessory dealers will swell the number of exhibitors to 76. The following cars will be exhibited: Moon, Dorris, Standard Six, Victor, Darby, Embree-McClean and Cunningham, all made in St. Louis; KisselKar, Cadillac, Peerless, Detroit Electric, Buick, Welch, E-M-F, Studebaker, Hupmobile, Regal, National, Lexington, Packard, Stevens-Duryea, Reo, Fal, Interstate, Maxwell, American, Simplex, Marmon, Oldsmobile, Oakland, Thomas, Chalmers, Hudson, Baker Electric, Atlas, Babcock, Stanley, Matheson, Corbin, Gaeth, Great Western, Rider-Lewis, Stoddard-Dayton, Studebaker Electric, Rauch and Lang Electric, Pierce-Arrow, Speedwell, Waverley Electric, Knox, Stearns, Brush, White Steam and Gas, Rambler, Parry, Paige-Detroit, Overland, Velie, Chadwick, Glide, Johnson, Columbus Electric, Firestone-Columbus, K-R-I-T, Winton Six, Jackson, Sterling, Apperson, Cartercar, De Tamble, Mitchell, Locomobile, Broc Electric, Westcott, Empire, Midland, Everitt, Springfield, Middleby, Smith Electric, Haynes, Pope-Hartford, Franklin.

NEWARK'S THIRD ANNUAL SHOW DETAILS

Newark, N. J., will hold its Third Annual Automobile Show during the week of February 19-26. It is said by those who know, that this show will compare favorably with greater shows held in New York and elsewhere. Newark, on account of its situation, is at once a part of the Metropolitan territory and is at the same time isolated from it. It is the center of the very prolific automobile section, and as such, much interest will be taken in the exhibition. One of the exceptionally interesting features at the show will be the exhibit of aeroplanes, which is promised will be the most complete one ever shown in America. This annual event which assumed large and important proportions last year, is looked forward to by Jersey enthusiasts with a great deal of pleasure, and this year it is expected that the local automobile agents will do a most thriving business, which is a matter involving some difficulties to explain due to the near presence of a host of New York agencies—citizens of New Jersey are patriotic.

INDIANA'S FIGURES SURPRISINGLY LARGE

The records of the Indiana Secretary of the State show that 72 new companies were organized in 1909, with an aggregate authorized capitalization of \$6,533,000. All of this represents automobile and kindred industries. In addition, 16 sales agencies and garages incorporated, calling for an investment of \$219,500. Seven new tire concerns came into existence during this year. The following companies increased their capital stock as follows: Overland Automobile Co., Indianapolis, \$1,400,000; Planhard Manufacturing Co., Kokomo, \$35,000; Simplex Motor Car Company, Mishawaka, \$200,000; Western Motor Co., Logansport, \$1,500,000; Auburn Automobile Company, Auburn, \$725,000, and American Motor Car Sales Company, Indianapolis, \$20,000.

GREAT PACIFIC COAST INVASION

California is coming into her own, so far as future racing events are concerned, and a number of important contests will be held this spring in the new Motordrome. Robertson announces that the Simplex people will build for him a light car somewhat along the Fiat "Cyclone" lines which he will also drive on the Coast. DePalma will be there with the original "Cyclone," while a third of this type, a Marmon 6-cylinder, is being built for Ray Harroun, of Chicago. Taking these in addition to other events, it will be seen that some of the usual speed battles of the spring will be fought on the Pacific Coast instead of over the old course as laid out on the sands of Florida.

TWO SHOWS FOR HARTFORD

Hartford will have two automobile shows, according to reports, instead of the one originally outlined. Neither one will run in opposition to the other. The local situation is a bit complex for the reason that no hall is available of sufficient size to accommodate would-be exhibitors. In consequence the second show, which is to run on the same date as the original exhibition, will be that of the Hartford Automobile Dealers' Association.

The Third Annual Show of the Hartford Automobile Dealers' Association from present indications bids well to outstrip all previous efforts of the organization. Fifty cars, representing 24 leading makes, are on the list, including some newcomers. The list of vehicles that will be on exhibition includes the Ford, Reo, Knox, Stevens-Duryea, Cadillac, Lozier, Waverly electric, Baker electric, Thomas, E. M. F., Flanders, Maxwell, Mitchell, Pierce-Arrow, Buick, Jackson, Rambler, Elmore, Cartercar, Interstate, Franklin, Empire, Hupmobile and McCue.

HARMONY SECURED IN CITY OF HOPS

MILWAUKEE, Wis., Jan. 29—The Milwaukee Automobile Club on Jan. 18 held a drawing for spaces at the second annual Milwaukee show, to be held in the new Auditorium from Feb. 22 to 27 inclusive. Dissension which marked the early campaign of the club for support among the dealers has almost disappeared, although there are still a few concerns determined to remain out of the show because they believe it more profitable to have private shows in their salesrooms, taking advantage of the interest aroused and crowds attracted by the big show.

ADDITIONAL EXHIBITORS AT BALTIMORE

BALTIMORE, Jan. 29—Fifteen belated dealers made such urgent demands for space at the coming Baltimore Show at the Fifth Regiment Armory, February 22 to 26, inclusive, after the first allotment of space had been made, that the show committee of the Automobile Club of Maryland had to rearrange plans to accommodate them. With the addition of this latest batch of exhibitors the number has been increased from 29 to 44.

A. A. A. TOUR FOR GLIDDEN TROPHY

At the meeting of the Contest Board of the American Automobile Association, held in New York, January 26, it was decided that the National Tour for 1910 should be a competition for the Glidden Trophy and that certificates to be known as "Glidden Certificates" should be issued to those contestants which finished the tour with scores that are within a small percentage of being perfect, the exact limits of such percentage to be determined and announced later.

The approximate date of the tour was set for June 15 to 30. The tentative route outlined, embracing about 2,300 miles, is as follows:

Starting at Cincinnati, Ohio; thence to Louisville, Ky.; Nashville and Memphis, Tenn.; Little Rock and Texarkana, Ark.; Dallas, Texas, Okla City, Wichita and Topeka, Kan.; St. Joseph, Mo.; Des Moines, Cedar Rapids and Davenport, Iowa; Rock Island and Moline, Ill., and thence to Chicago.

SAVANNAH DISCUSSING GRAND PRIX

At a recent meeting of the Executive Committee of the Savannah Automobile Club plans were discussed for an international race to be held in Savannah on Thanksgiving day. At the meeting it was decided by those that attended to start work at once so that everything could be arranged in due time. Besides having an international race a stock car race will be had the preceding day, making the programme very similar to that of the Grand Prize race, held November, a year ago. Savannah is rapidly becoming an automobile center of the first importance in the South, and trade in cars is expanding considerably.



President Taft Rides in a Four-Cylinder Franklin

When the President rides out in an automobile, as he does frequently in contradistinction to his predecessor, the owner of the machine feels that he is signally honored, and hastens to chronicle the fact. Above our smiling executive is shown in the tonneau of a four-cylinder Franklin. The house is the Texas ranch house of Chas. P. Taft.

Spokane Taxicab Company has been reorganized with increased capital, and will begin operations with twenty high grade cars the latter part of February or early in March. Plans have been made for construction of a three-story garage, to cost \$30,000, in the business district, and it will be rushed to completion. The new company, which has acquired the interests of C. E. McBroom, Robert H. Cosgrove and J. D. Williams, incorporated as the Spokane Taxicab Company, is composed of the following: W. G. Graves, Fred B. Grinnell, F. J. Holman, E. H. Knight, Clyde M. Graves, W. S. Norman, J. F. Carey, F. T. McCullough, Dr. R. R. McClure, Walter J. Nicholls, J. L. Prickett, D. B. Fotheringham, J. H. Spear, Dr. H. B. Luhn, Dr. S. B. Hopkins, George W. Merrill.

Louisville motorists have a fad which is growing rapidly. Unique emblems of every description, including Billikens, north poles, birds and beasts are being substituted for plain caps in front of their cars. Among the more popular emblems may be mentioned the north pole, while Prince Wells may be identified by a miniature facsimile of the road race cup which he won recently. Billy goats, monkeys and eagles occupy prominent and somewhat exposed positions on the fronts of the radiators.

On January 13 the Michigan Lodge, National Association of Stationary Engineers, entertained one hundred engineers and mechanical experts from Detroit, Michigan and other cities, in the club rooms of the Michigan Steam Motor Company. Before the banquet those present inspected the new steam truck built by this concern. It is said that the engine in this type of truck is especially designed for general motive work where economy of space is desirable.

It is said that a number of motor trucks and business wagons in Louisville is about 20 per cent. more at this time than last year. The motor car has made steady inroads on the stronghold of the work horse and development along this line indicates the ultimate revolution of the old methods of handling goods, so far as the big cities are concerned.

The Automobile Club of Rochester is holding its second annual winter endurance run, having Syracuse as its objective point for the first night and return by another route to Rochester the second day. The Palmer-Singer 6-60 will be the pace-maker on the trip. This car has just completed its pathfinding trip made by Bert Van Tuyle, secretary of the Automobile Club.

It is said that Toledo, O., will get the Sterling vehicle plant, which proposes to manufacture a $1\frac{1}{2}$ and a 3-ton truck. According to reports, the company, which is backed by Chicago men, and which has had several trucks manufactured, has practically closed negotiations for a site in Toledo. A. B. McCord will be the technical man at the head of the company.

Appreciating the valuable service rendered to the newspaper editors in Lancaster county, in their recent campaign for better country roads, the Lancaster Automobile Club has elected to honorary membership in the club each of the 30 editors within the domains of the county. It is said that this campaign has resulted in many road improvements in that locality.

In the American exposition which will be held in Berlin, Germany, during the months of June, July and August, a section has been set aside for the display of motor boats, engines and accessories. It is proposed to appoint an American committee to represent the motor boat industry of the United States.

The Asbury Park Automobile Company, of Asbury Park, N. J., has incorporated with a capital stock of \$50,000. They will manufacture automobiles and conduct garages. The incorporators are: Daniel Havens, Fletcher T. Weeden, William C. Weeden and Louis P. Croce, all of Asbury Park.

The Motor Car Conveyance Company, New York City, has incorporated with a capital stock of \$100,000. This concern will buy, sell and lease motor vehicles and taxicabs. The incorporators are: C. E. Lockwood, East Orange, N. J.; A. Lee, Brooklyn; J. W. Chapman, New York City.

Plans have been prepared for the Patent Holding & Mfg. Company to erect a four-story building for the manufacture of a commercial automobile to be designed by George E. Salzman, who will be superintendent of the plant. This company will also go into the garage business.

Bangor, Me., is to have an automobile show, to be held at the Auditorium from April 23 to 29, inclusive. This is the second annual exhibition in Bangor, and it is believed that there will be exhibited an even fuller line of cars and accessories this year than there was last.

The Owosso Motor Company, organized by a number of Owosso (Mich.) business men, will have a factory either in the latter town or in Detroit. They will manufacture a commercial car to sell for \$1,850, rated at 20-horsepower. E. M. Clark is the general manager.

The Hartford, Conn., fire department wants a flying squadron to take the place of the horse-drawn chemical wagon. The board of fire commissioners, it is said, have in mind a Pope-Hartford machine. Five thousand dollars have been appropriated for the proposed purchase.

The Belnord Automobile Storage and Supply Company, New York, has incorporated with a capital stock of \$10,000. They will deal in rubber tires and operate storage houses and garages. The incorporators are: I. Irving Cohn, Henry M. Flateau and Joseph Marx.

The J. J. Harper Company, Lynchburg, Va., has incorporated. The directors are: R. D. Apperson, president; L. G. Apperson, vice-president; G. O. Lee, secretary and treasurer. Capital stock, \$25,000.

The date of the proposed All Connecticut Endurance Run has not yet been settled, and will not be until the A. A. A. takes action. It is said that this affair will take the form of an "automobile week" to include many other events.

Joerns Bros., of Stevens Point, Wis., with large interests at Sheboygan, Wis., and St. Paul, Minn., have organized a corporation with headquarters in St. Paul, to manufacture motor cars and trucks. C. A. Joerns, of Sheboygan, will be general manager.

The Post Lock Register Company has incorporated in New York City with a capital stock of \$150,000. They will manufacture taxicabs and lock registers for the same. The incorporators are: T. W. Post, G. W. Moore, and C. Colgate, New York City.

It is reported that a corporation for the manufacture of motor cars will shortly be formed in Walton, N. Y. E. B. Guild and George H. May have been appointed a committee to investigate the merits of different parts.

A midwinter endurance run from Hartford, Conn., to Pittsfield, Mass., thence to Springfield and back to Hartford has been proposed. On this same route traveled last year a Mitchell, driven by D. F. Smith, the local Mitchell agent, won out.

The Showalter Manufacturing Company, of Connorsville, Ind., has been incorporated with the following officers: President, T. H. Showalter; vice-president and general manager, H. G. Showalter; and treasurer, E. W. Showalter.

It is reported that the plans for the new Central Police Station and Criminal Courts Building at Milwaukee, Wis., to cost \$250,000, will include a garage division for the care and maintenance of the cars owned by the city of Milwaukee.

The board of directors of the Motor and Accessories Manufacturers, Inc., will hold a meeting in Chicago February 10. W. M. Sweet, manager, with headquarters in New York, will spend several weeks in Chicago at that time.

Articles of incorporation have been filed by the Ellis-Tonnele Company, of Jersey City, N. J., with a capital stock of \$50,000. They will deal in automobiles, supplies, parts, etc. Incorporators: A. L. Ellis, L. J. Tonnele and L. E. Herrman.

At the annual meeting of the Farmers' Mutual Insurance Company held at Lansing, Mich., the chief subject of discussion was automobile insurance, the association finally taking a stand against carrying automobiles as risks.

To the generosity of San Francisco motorists, enough cars were loaned to the children's agency of the Associated Charities to enable that organization to give 300 children an outing in Golden Gate Park.

The Co-Auto Motor Company, Indianapolis, has been incorporated with a capital stock of \$25,000 and will manufacture and deal in automobiles. Incorporators: M. G. Beckner, J. Harrison and F. W. Wiese.

Application is shortly to be made for a charter for a new company in Philadelphia, to be known as the Lyman Tire & Rubber Company, which is to manufacture and deal in auto tires and appliances of all kinds.

The American Engine & Motor Company, of Wilmington, Del., has been incorporated with a capital stock of \$1,000,000. They will manufacture rotary engines, automobiles, motor vehicle and power boats.

The Windsor Motor Company, Buffalo, N. Y., has been incorporated with \$10,000 capital. The directors are: Henry M. Colgrove, Joseph Schmid, Jr., and Joseph J. Buettner.

The Milwaukee Chauffeurs' Club, recently organized at Milwaukee, Wis., has elected these officers: President, Marcus Wernicks; vice-president, Emil Krueger; secretary, J. A. Mayberry; treasurer, Michael Flynn.

The Omaha Automobile Show will be held from February 21 to 26, inclusive. It is expected that the leading manufacturers will be strongly represented therein.

It is said that over 100 carloads of automobiles were taken into Detroit for exhibition at the automobile show. Nearly 300 models of automobiles are exhibited.

The Maurer Garage Company, of Sheboygan, Wis., has been incorporated, with a capital stock of \$15,000, by G. A. Franche, A. G. Maurer and F. G. Voigt.

OLDFIELD PURCHASES BENZ RACER

It is said that Barney Oldfield has purchased outright the new German Benz racing car in which Hemery made the world's record speed in England. This statement is said to come from Jesse Froehlich, managing director of the Benz Auto Import Company. He states that the car sold for \$14,000 and that in the future Barney would have entire charge of it. This being true, the somewhat complicating rumors afloat concerning the probable pilot of this car may now be set at rest, as it is expected that Oldfield will drive the giant racer in all important contests.



George Ade, the Humorist, in His Mitchell Roadster

Even funny men ride in automobiles nowadays, as is evidenced by the picture above, which shows America's foremost witty man seated at the wheel of his small Mitchell roadster. In this little car Mr. Ade rides many miles in the course of a year, always finding the car "on the job."

In the early spring of 1896 Frank B. Stearns, then a young inventor of Cleveland, Ohio, produced one of the first "motor carriages" ever seen in Ohio. It was of the single-cylinder type, and although it was heir to all the troubles of the early type of automobiles, it is still in running order to-day. Single-cylinder cars were produced until the latter part of 1901, when the first 2-cylinder motor was produced. In it Mr. Stearns won a first-class certificate in the famous Mud-Lark run in 1904 from New York to Pittsburgh. The growth of the Stearns factory has been noteworthy. The production has been steadily increasing, the output for the current season amounting to very close to 1,000 cars. With the extensive additions and improvements planned for the coming season, the output will be over the 1,500 mark. The number is equally divided between 15-30 and 30-60 models.

At the annual meeting of the B. F. Goodrich Company last week the directors decided to proceed with extensive factory additions early next Spring. The company has been adding two six-story buildings each year for the past two years. An appropriation of \$1,000,000 was made for the additional improvements. The principal change in the official list came from the retirement of W. A. Folger as treasurer after spending 26 years in the rubber business. He is succeeded by W. A. Means, assistant treasurer; C. B. Raymond, secretary, was elected to the office of assistant treasurer. B. G. Work was re-elected president; F. H. Mason, vice-president; H. E. Raymond, second vice-president, and E. C. Shaw, general manager of works. The stockholders re-elected the old board of directors.

At a recent meeting held in New York, various officials of the Lozier Motor Car Company discussed the matter of length of service of many of the employees. It was noted that during their bicycle days

this company gathered together a very strong working force and carried it practically into the motor business. Among those holding records for long service may be mentioned J. D. Perrin, the engineer of the company, with eighteen years to his credit; Samuel Roger, treasurer, started twenty years ago as an office boy; C. A. Emise, sales manager, has been with the Lozier company for seventeen years, and E. C. Cleary has had a service of thirteen years.

B. G. Vreeland, president of the Vreeland Bros. Automobile Company, Denver distributors of Moon cars, left St. Louis for home Tuesday, after a week at the Moon factory. Coming direct to St. Louis from the New York shows, Mr. Vreeland stopped at St. Louis to familiarize himself with the Moon construction. To do this he took off his coat, donned machinist's overalls, and with one of the factory engineers went over the various processes of manufacture and assembly. He said, when leaving the city, that he thought more of Moon cars than ever after his mechanical tuition.

The Allis-Chalmers Company, of Milwaukee, is shipping out each day large orders for electrical apparatus to motor car manufacturers, including E. M. F. Co., Detroit, Mich.; Oak Park Power Co., Flint, Mich., auxiliary of the General Motors Co. of Flint, Mich.; Kelsey-Herbert Wheel Co., Detroit; Rapid Motor Vehicle Co., Pontiac, Mich.; American Motor Castings Co., Brush Runabout Co., Detroit. Factory cost is reduced to a considerable extent by the motor-drive system, and has already resulted in reductions in wholesale prices for manufactured articles.

The Flint Auto Top Company, of Flint, Mich., organized and incorporated last week for the purpose of manufacturing automobile and launch tops. It is capitalized at \$10,000, with the fol-

lowing officers: M. L. Dyer, president; S. D. Bolton, vice-president; C. A. Fot, secretary and treasurer; A. W. Myers, superintendent, with temporary offices and factory at 1104 North Saginaw street, allowing a daily output of from 75 to 100 tops. Within the course of 60 days they will be able to triple their capacity, as their new factory will be ready for occupancy by that time.

A number of changes have taken place in Hartford, Conn., local selling field. S. C. Hutchinson has succeeded Robert R. Ashwell as the head of the Franklin agency. Russell Faber, who recently acquired the Reo, has also taken on the Knox. George B. Knox, the Peerless representative, will handle the Hudson. Alexander Smith has given up the Regal. E. H. Harris will succeed A. W. Pearn as agent for the Overland. The Hupmobile and Everitt go are represented by C. K. Hanson. All the local agencies report very bright prospects and many immediate sales.

J. C. Zimmerman, of the Green Bay (Wis.) Motor Car Company, which recently succeeded to the business of the motor car department of Gottfredson Bros. Co., wholesale hardware, has sold his interest to W. H. St. John, of Oshkosh, Wis., and will retire. H. J. Malchow, who, with Mr. Zimmerman, organized the Green Bay concern, remains. The company's garage on North Jefferson street has recently been enlarged to nearly twice its former capacity, and 60 cars can be handled with ease. The repair shop has been made a feature.

As an instance with which the Diamond quick detachable demountable rim can be handled it is but necessary to say that during the Madison Square show this device was demonstrated to a prospective buyer who, after making inquiry concerning its points, said that while the rim was being demonstrated it was removed and applied no less than a dozen times and apparently with the same ease with which a man takes his watch from his pocket and puts it back.

Recent consular records from all sections of the globe indicate a slow but sure increase of imports of American cars into foreign countries. The Royal Tourist car company is making bids for business in this field in a conservative but effective way. As an instance of this it may be cited that Clifford W. Fuller, secretary of the Royal Tourist company, and K. V. Painter, a stockholder, are carrying the Royal propaganda into South Africa.

The Ohio shaft-drive electric, manufactured by the Ohio Electric Car Co., of Toledo, Ohio, has placed three new agencies: In Denver, with the Mathewson Automobile Co., 1624 Broadway street; in Louisville, Ky., with the Dunham Automobile Co., 444 South Third street, and in St. Louis, with the Smith Automobile & Battery Co., 5027 Delmar Boulevard. This new electric is the only shaft-driven automobile ever made without a universal joint.

The Colonial Tire and Rubber Company, which controls the Firestone tires in Europe, has declared a 10 per cent. dividend, and elected F. S. Lahm, the noted aeronaut of Paris, as president; J. A. Swinehart, vice-president; P. D. Hall, secretary and treasurer. The other directors are William Byrider, John Byrider and Frank E. Whittemore. The Firestone patents in America were originally owned by J. A. Swinehart, who recently returned from Europe.

The Penn Motor Car Co., of Philadelphia, entertained all of the sales managers throughout the State of Pennsylvania, as well as the officials of the Mitchell car as its guests, at a banquet at the Hotel Walton in that city. A. B. Berrian, of Racine, Wis., representing the factory end of the company, and Charles B. Skinner, the New York manager, was present as the Eastern delegate. More than eighty guests were present.

The Wilcox rubber plant at Mansfield, Ohio, headed by F. A. Wilcox, of Akron, suffered a \$16,000 loss last week on account of fire. The company manufactures tires. At the annual election officers were elected as follows: President, F. A. Wilcox; vice-president, C. H. Walters; treasurer, F. M. Bushnell; secretary, F. W. Walters; these, with C. R. Grant, Dr. James E. Waite and Dr. R. C. Kinnaman constituting the directors.

The Holbrook-Armstrong Manufacturing Company of Racine, Wis., is perfecting a new type of four-cylinder motor, which, it is reported on reliable authority, will be used exclusively by the Racine-Sattley Company for the production of gasoline cars and trucks. The Holbrook-Armstrong Company is said to have contracts for delivery of its motor to the Sattley concern beginning in 30 days.

The Yeomans Body and Box Company, of Detroit, will make an extensive addition to their plant. This is made necessary by the growing requirements of automobile manufacturers. The board of directors of the company are: Arthur Yeomans, president; Albert Fritzsche, vice-president; Fred H. Yeomans, secretary and treasurer, and John T. Lombard.

With W. C. Durant, general manager of the Buick Company in Flint, Mich., as host, a large party filling a special train of 12 cars journeyed from Detroit to Flint, where a complete inspection of the Buick plant was made. Some idea may be had of the size of this institution when it is stated that the Buick payroll exceeds \$192,000 every two weeks.

Lang & Scharman, agents for the Maxwell at Marshfield, Wis., have produced a "sleighmobile" by remodeling a Maxwell runabout into a sleigh. The front wheels have been removed and replaced with runners, while heavy anti-skid chains have been attached to the rear tires. The contrivance makes excellent speed on snow-covered roads.

Entire K-R-I-T product for 1910 has been sold, its final agencies having been closed several days ago. Three hundred and twenty-five cars were allotted to Cleveland, Buffalo and San Francisco, and the entire output of the company, 1,000 cars, has already been taken care of. It is said that the demand was much larger than the supply.

The Sheldon Axle Company, of Wilkes-Barre, Pa., for thirty years makers of axles, have for seven years been making commercial automobile axles and it is said that during this time they have never lost a customer and have built the largest factory of its kind in the world.

Goodrich tires were well represented in the two New York shows. Out of fourteen makes of tires represented at the Madison Square Garden show, the Goodrich had a natural representation. In Detroit also this tire had a very large representation, especially on the high-priced cars.

The story which has been circulated to the effect that the Chalmers-Detroit Motor Company is interested in the building plans of the Hudson Motor Car Company was denied by Chalmers-Detroit by wire just as *THE AUTOMOBILE* was going to press—particulars not available.

It is stated that more than eight thousand Franklin air-cooled motor cars are now in use, the total of shipments from the factory in Syracuse having passed that number a few days ago. The Franklin is making some splendid road and hill records in the far West.

Realizing chain defects as they exist under unfavorable road conditions, the Baker Motor Vehicle Company, after experimenting with various types of transmissions, has announced that all their 1910 models will be equipped with bevel gear shaft drive.

Bacon's Garage Co., Inc., of Hackensack, N. J., are the Bergen County agents for the Mercer Car, and represent locally the E. M. F. and Flanders and Buick. James Bacon is president and Ralph D. Early is secretary and treasurer.

The Brown Automobile Company has taken the agency for the sale of National cars in Louisville, Ky., and New Albany, Ind. The Velie will be represented in Louisville by the Dunham Automobile Company.

The Ajax-Grieb Rubber Company, of New York, has issued a very pretentious and handsome calendar, ingeniously contrived, and embracing a distinct novelty. It is much appreciated by the trade.

PERSONAL TRADE MENTION

"Bud" Moran, who recently became manager of the Craig Auto Company, of Detroit, will handle the output of the new Abbott Motor Company in Michigan. John B. Philip, formerly with the Chalmers-Detroit Motor Company, is in charge of the Abbott factory, and with perfect organization this concern promises prompt delivery.

Gordon MacGregor, in charge of the Canadian interests of the Ford Motor Co., has just completed a trip around the world in the interests of the company. Mr. MacGregor left Watervliet, Canada, in the middle of August, and has since then traveled 140,000 miles.

Jack Barnes, for three years a well-known mechanician, and more recently a driver of racing cars, has accepted the position of superintendent of the Delavan Lake Boat and Engine Company. The company operates a large shop for motor car repairs and has a garage.

W. N. Booth, for several years connected with the sales department of the Olds-Oakland Company, Cleveland, has invented a demountable rim, and has organized the Booth Demountable Rim Company to manufacture it.

A. A. Grimes, formerly connected with the sales department of the Cleveland, Ohio, branch of the Warner Instrument Company, has accepted a position as sales manager of the Cleveland Speed Indicator Company.

R. Harry Croninger has assumed the management of the American Locomobile's plant at Providence. He was formerly connected with the Pennsylvania Auto Motor Co., at Bryn Mawr, Pa.

B. T. Strickland, of Fitzgerald, Ga., has sold his garage and will open an automobile livery.

H. S. Larzelere will be in charge of the Chadwick exhibit at the Chicago Show.